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A KINDLY SUGGESTION

The humidity and temperature may be high, but little things like these do not interfere with the ambitious industrial-arts teachers planning for the coming year. Probably there are some articles in last year's INDUSTRIAL ARTS AND VOCATIONAL EDUCATION which you did not have time to read and digest. Now is the time to do it. Probably, too, you have not carefully studied all of the projects which have appeared in that periodical during the last twelve months.

It is not too late to start spending a short time each day to catch up on your neglected reading. You may find no little enjoyment and we hope no little benefit by looking over last year's volume.

THIS MONTH'S COVER

Our cover this month shows how industry does it. The numerous punches shown in the enormous press perforate the thick steel shell much faster than any drill or set of drills could do the job.

Photograph courtesy of the Cincinnati Shaper Co., Cincinnati, Ohio.

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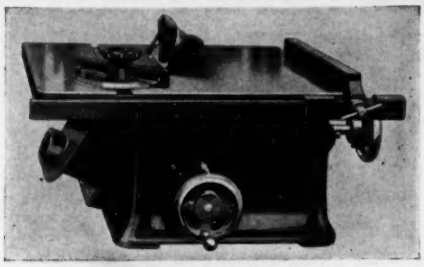

J-20 Tilting Arbor Saw

J-31 Hand Jointer

Descriptive circulars of these machines will be gladly sent upon request

Only good tools will produce good work

ONLY with good tools—tools of the most modern design and construction—can the pupils of vocational and manual training schools learn to do good work. No amount of theorizing can counteract the retarding influence and the discouraging effect on the pupil resulting from poor craftsmanship, which frequently is directly attributable to poor tools.

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THE STANLEY RULE & LEVEL PLANT
EDUCATIONAL DEPARTMENT
NEW BRITAIN, CONN.

STANLEY TOOLS

INDUSTRIAL ARTS and VOCATIONAL EDUCATION
August, 1933
Vol. 22, No. 8

Handling Large Classes

Harold J. Van Westrienen

Director Vocational Education, Hamtramck Public Schools, Hamtramck, Michigan

Increasing the class load presents problems which must be solved. This article shows how this can be done.

Influences Affecting Class Size

THE matter of class size has been a subject of considerable controversy for several years. Tradition has fostered the smaller class, and teachers in general have rebelled whenever there has been a suggestion of increasing classes beyond the established size. Shop teachers have contended that the nature of their work placed them in a special category, and that it would be unwise, if not fatal, to put over 25 pupils in a shop class. Associations of schools have placed definite maximums as to class size which were followed religiously when school programs were being made. There have been two definite influences during the past few years which have tended to break down these traditions, one economic and the other educational in purpose. These movements have not confined themselves to any particular phase of the school program, but have been general in scope.

Economic Reasons for Large Classes. Until the present economic situation resulted in a serious reduction in income for educational purposes, there was no particular pressure brought to bear upon administrators to increase the size of classes. Tradition being firmly entrenched, and money plentiful, it was easier to abide by the *status quo* than to force teachers to accept larger classes.

With a decrease in tax collections, however, every administrator in the country found it necessary to economize, and teachers are being required to accept 40 to 60 pupils in both academic and shop classes. In some cases classes have been increased to 75 and 100 pupils. This would be impossible without improved methods of instruction.

Educational Factors Influencing Large Classes. Preceding the economic crisis there were numerous experiments for the purpose of determining the relative efficiency of the large and small class. These experiments were stimulated by progressive educators who contended that outcomes of instruction should be more than the mere acquisition of subject matter and skills. It was recognized that learning and skills were not retained permanently unless constantly used, and that there were other abilities such as vision, self-direction, self-control, self-appraisal, and coöperation which were even more important than skills and knowledge.

With the schools producing graduates who were increasingly better in subject-matter learning and skill, society was not improving in its ability to cope with many of its most important problems; people were not improving in their attitudes and habits toward life, and were not able to coöperate voluntarily in solving social ills; business men, industrial leaders, statesmen, and politicians were not exhibiting the necessary amount of vision and self-direction in meeting the social and economic problems that faced them and society as a whole. Educational philosophers and administrators recognized that the problem was eventually to be placed with the schools for solution. They further recognized that our philosophy of education was in need of revision and took steps to correct it. They realized that if the new purposes were to be achieved, there was a need for changing the classroom methods of instruction, and that these methods were just as well, if not better, adapted to large as to small classes. They further recognized the value of the teacher who was capable of using these improved methods and the fact that if he was to be adequately rewarded financially it would be necessary to increase the size of classes and reduce the unit cost of instruction. The result was in experimentation with large classes and this proved that the same results in achievement could be obtained providing physical equipment and methods were adequate.

Social Factors Bearing on Large Classes. Modern social life is associated with large numbers. Big business, large industries, and every other phase of present-day life finds people working, playing, and living together in large groups. If pupils are to live this way why shouldn't they be *taught* to live this way? If the classroom is made more nearly like life, there will not be so great a gap between school and life. It will not be advisable to begin at the maximum, but as the pupils become more independent and self-reliant they should be gradually placed in larger and larger groups in the classroom.

Conclusion. Whether or not we agree with the progressive educator as to the educational advantages of large classes, and although we may be unwilling to accept the new philosophy, the present economic situation forces us to accept the large class and take steps to adapt our classroom methods to it. In actual practice we may find it equally necessary to accept the new philosophy if we can hope to be successful in meeting the large-class problem since the large class cannot be handled successfully from the traditional point of view. In other words, the teacher and pupil in the large class must assume a different relative position in the class situation if the results are to be satisfactory.

The New versus the Old Philosophy of Education

Assuming that a new point of view is necessary, let us compare the old and new in terms of methods and outcomes.

The Old Philosophy and Methods. It has been thought for a long time that in order to be successful in life one must learn or acquire considerable of the heritage of the past. Little thought was given to the application of this knowledge in solving present-day problems. It was assumed that the graduates of our schools would be able to develop the practical side of living after leaving school. Teachers prepared a set of facts to be learned and the pupil seldom was taught to recognize their significance in solving the problems of life. The child's purpose in most cases was to "get by" with the teacher. There was seldom any attempt to adjust activities to meet children's purposes, and extrinsic rewards in the form of marks, gold stars, and honor rolls were used as bait to get the child to study. The teacher dominated the classroom situation and the child conformed for fear of punishment. When the teacher was absent from the room the children did not assume responsibility for self-control. If the work was acceptable to the teacher, that was sufficient. Children who in future life would be required to work coöperatively with others were not allowed to help each other in the solution of common problems. In general, the traditional situation retarded the development in children of those attitudes, habits, and abilities which are most necessary for successful citizenship, namely:

1. Vision — The ability to see problems in their own and the social life.
2. Self-direction — The ability to make plans for and solve these problems.
3. Self-appraisal — The ability to make standards and judge the efficiency of achievement.
4. Self-control — The ability to control actions and refrain from fooling and disturbing others.
5. Coöperation — The attitude and ability to work together in the solution of common problems.

Methods That Will Facilitate Adequate Learning. The adequate teacher is now attempting to stimulate, assist, guide, and counsel the pupils in such a manner that the new purposes may be achieved. He so plans his work that the activities are in terms of natural pupil interests and whenever possible, of social significance. He encourages the child to make his own plans, make standards, appraise his own work, help other pupils, make standards for control, and to generalize from his experiences so that his future work will be increasingly more successful. Generalization in simple language is "profiting by experience." Under the direction of this type of teacher the student develops in "power" to meet new situations which will serve him and society in future years. There is no attempt to eliminate the learning of subject matter and the acquiring of necessary skills. These results are by-products of learning and are acquired consciously and purposefully by the child when he fully comprehends their true significance and relationship to his purpose.

Conditions Favorable to Learning in Large Classes

Assuming that we are clear as to the fundamental concept of the new philosophy, let us consider the things necessary for successful teaching and learning under large-class conditions.

Physical Conditions. The matter of equipment and supplies is no different than with the small class. There must be adequate benches, seats, tools, blackboard space, files, supplies, etc., so that every child will have a place to work and material to work with in carrying out his plans. It is impossible to obtain satisfactory results if 60 pupils are housed in a room equipped for 25 pupils.

The Teacher. The teacher in the large-class situation will first of all need to have a clear concept of the new philosophy. He will need to be creative so that adequate lesson sheets can be provided. He will need to be resourceful in meeting problems, and in devising teaching techniques and devices. He will need to be a good organizer since work must be planned before the class meets. He will need to be sympathetic, coöperative, and democratic, or the pupils will not be given the opportunities or assistance necessary to help them develop in terms of the new philosophy.

Instruction Material. Large classes cannot be handled successfully with the use of conventional instruction material and devices. The larger class will result in accentuating individual differences and the teacher cannot present the same assignment, in the same way, to a large group. This makes it necessary to provide lesson sheets (the use of which will be explained later), check sheets, self-administered practice tests, self-appraisal scales and descriptions, progress charts, achievement and power tests of the objective type, and an adequate library of text and reference books.

The Pupil Activities. Class and individual projects and problems must be adjusted to the level of the group, and there will need to be sufficient diversification to meet every level of intelligence, ability, and interest within the scope of the subject. Slow pupils must be allowed to begin on their own level and be allowed to grow according to their own rate. We cannot expect the same achievement from pupils of widely

different interests, mentality, social background, emotions, and abilities. The improvement or growth of the individual child is more important than the achievement of a uniform learning and skill by everyone.

The Large-Class Situation and How It Should Be Conducted

Let us picture a new group of 50 or 60 pupils in a class in shopwork. To the traditional teacher it would bring a sense of uncertainty bordering on fear. To the teacher inspired with a sense of service, having adequate equipment, supplies, and instructional materials, and trained in method, it represents a challenge and an opportunity for service.

The First Lessons. The first problem facing a new teacher is one of organizing the class and bringing problems of classroom control to the consciousness of the pupils.

1. If the pupil is to be trained in self-government, the teacher must shift the matters of routine control to the pupils. There is the roll to be taken, lesson sheets to be filed and distributed, tools to be checked, supplies to be economically issued, and other similar matters to be provided for.

The first lesson sheet will, therefore, orientate the child to these situations and allow him to have a share in planning the procedure for handling these situations. Each pupil should be given the opportunity of making a plan. These individual plans can then be compared and combined into a group or class plan that is acceptable to everyone in the class.

With a plan adopted, an election of officers and monitors is held, at which time the pupils are given practice in parliamentary procedure and voting. Making the plan provides training in coöperative thinking, planning, and harmonization of conflicts. This situation is far superior and much richer in terms of pupil growth than the traditional teacher-dominated situation.

2. The next lessons may then take up matters of standards, safety, care of tools and equipment, and similar problems usually decided upon by the teacher. The classroom and equipment can be kept in good order through a procedure both planned and executed by the teacher, but if pupils are to develop self-responsibility in these matters they should be given a part in planning and administering the program. With the large class the teacher cannot afford to spend his time with being a watchdog and janitor. With the problem assumed by the students, they will be alert to things that are wrong and take steps to correct them. At strategic times there should be class discussions concerning these matters so that the pupils can be restimulated to see the problem, but as time goes on, and pupils become more and more able, this will need to be done less frequently. The proper attitudes and habits of safety and cleanliness will eventually become a part of the child's personality.

The Introduction of Class Projects. The boy cannot be kept interested indefinitely in matters of control. He has entered the course with the idea of making something and this opportunity should be given him as soon as possible. In the traditional school the teacher has prepared a set list of projects which must be made by every boy. Such a procedure is indefensible. Boys have varied interests and needs, and if there were older brothers the home has already been well equipped with tie racks, broom holders, hall trees, and similar traditional projects. There is no reason to believe that fundamental skills cannot be developed through making other types of projects. A well-organized lesson sheet will make the matter of selection a simple one. Selection is mentioned because the word *assignment* indicates teacher domination which has no place in the modern scheme of education.

1. The lesson introducing the opportunities. This lesson sheet should first orientate the boy to the material, tools, and projects that he will be privileged to work with during the course. Purposes should be stated from the standpoint of the child and not the teacher. The pupil is not interested in developing tool skills and learning technical facts at this stage of the game, but wants to know what he can make.

One way to do this is to classify all the projects that are within the scope of the course into groups that represent pupil interests. There are projects in almost every type of industrial activity that can be classified under such purposeful headings as:

a) Tools for the home workbench.
b) Outdoor sports equipment.
c) Indoor sports equipment.
d) Things to please your mother.
e) Things to please your father.
f) Toys for your younger sister or brother.
g) Equipment for your boys' club.
h) Etc.

Each project from each group can be graded as to level of difficulty so that the boy can select simple projects requiring but few operations at first, and gradually attempt more difficult projects as he improves in ability to plan, execute, appraise, and use the tools and equipment provided.

Lesson Sheets and Supplementary Sheets. When the boy has selected a project on his proper level, he should be given the opportunity to carry out his purpose. There is little justification for requiring a boy to sit through a long series of lectures or watch a seemingly never-ending program of demonstrations. The average demonstration of this type is not more than 25 per cent successful. The slow child will miss most of the points brought out by the teacher; the bright boy will be ahead of the teacher and spend his time fooling or thinking about when the teacher will let him get to work; few of the boys will have progressed to a point where these demonstrations are applicable to what he will be doing in the immediate future, and will be forgotten by the time they are ready for them; the absent student loses out entirely or necessitates a repetition of the demonstration later; while the entire procedure can be classified as exceedingly wasteful. The tradi-

tional teacher will immediately insist that pupils must know these things and that it is wasteful of time and dangerous to let boys go to work without this preliminary training. It might be possible to agree with this teacher were it not for the supplementary sheets and the new point of view regarding the learning situation. These problems will be explained in the succeeding paragraphs.

1. When the boys have selected their projects there should be provided for them a series of lesson sheets and supplementary help sheets. If a boy chooses to make a center punch, he should be able to go to the file and obtain a lesson sheet suggesting the general procedure for accomplishing his purpose. It should not be of the traditional "Job Sheet" type which outlined every step in detail. The old-type job sheet robbed the boy of every opportunity to plan his own work.

As an example of the suggested type of lesson sheet, you are referred to the one illustrated below. It contains a few introductory remarks which are intended to better orientate the boy as to the purpose and use of the center punch. He is next asked to obtain a copy of the Layout and Stock Bill Sheet and make a free-hand working sketch of his project. Having clearly in mind what he is to make, he is next referred to the problem of planning his procedure on the Individual Plan Sheet for Lathe Projects. His efforts in planning will be rather crude and inadequate in his early experiences in any particular shop, but with repeated attempts and proper guidance in "generalizing" from past experience, he will soon become independent of the teacher and the Check Sheets which are a substitute for direct teacher help.

2. Before the boy is allowed to use the check sheet, he is encouraged to meet with a group of other boys who are working on the same problem. This small group compare their plans and agree upon a "best" plan which involves the best ideas of the group. This procedure provides practice in voluntary coöperative planning which will carry over into life. So as not to allow the student to proceed with an inadequate plan, he is next referred to the check sheet for the project he is working on which serves as a check on his own planning. A sample check sheet is illustrated. By comparing his plan with the teacher's, he is able to discover the ways in which his planning was faulty and correct it accordingly before proceeding with his work.

3. With his plan of procedure completed, the boy goes to the foreman and teacher to have his plan approved so that he can get his stock from the stock foreman.

4. The next step in carrying out his purpose will involve a series of processes including straight turning, taper turning, knurling, hardening and tempering, polishing, etc. If he has had previous experiences in these processes he will be able to proceed without instructions, but if any of the processes are new, he is given references to supplementary instruction sheets dealing

MACHINE SHOP I

UNIT V - PROJECTS THAT CAN BE MADE ON THE LATHE

LESSON 4 - HOW TO MAKE A CENTER PUNCH

A center punch is a small tool which serves many purposes in the machine shop, the auto shop, and in the home workshop. It is used principally to locate centers for holes and as a guide for the drill. It is also used when laying out work on iron and steel and for this reason it should be made of tough steel so that it will not bend or break, and hardened so that it will retain its point. There are many kinds and sizes of center punches. The center punch shown in the sketch represents the most common type. They vary in size, depending upon the kind of work for which they are to be used. This lesson will help you to make a center punch for your tool kit.

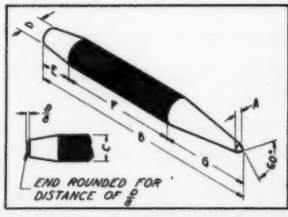


TABLE OF SIZES

A	B	C	D	E	F	G
1/16"	2 7/8"	5/32"	3/16"	7/16"	1/2"	45/64"
5/64"	3 5/16"	1/8"	7/32"	1/2"	1 11/16"	1 1/8"
1/32"	3 3/16"	9/32"	1/4"	5/8"	1 11/16"	1 1/4"
1/8"	3 7/8"	11/32"	5/16"	3/8"	1 15/16"	1 5/16"
5/32"	4 1/2"	13/32"	3/8"	11/16"	2 1/8"	1 7/16"
3/16"	4 9/16"	15/32"	7/16"	11/16"	2 1/8"	1 1/2"
1/4"	5"	1/2"	15/32"	3/4"	2 3/8"	1 5/8"

C-Assignment

Planning Your Project

A. Your first step in planning your center punch is to obtain a "Drawing and Stock Bill Sheet" and make a detailed free-hand working drawing showing the exact size and shape that you want your center punch to be.

B. Perhaps you have already run a lathe and know the operations necessary to make a center punch. Ask for an "Individual Plan Sheet for Lathe Projects" and plan the procedure you will follow in making your center punch.

C. After you have completed your plan, compare it with the plans made by other members of your group. The group plan should contain the best ideas of each member of the group. The instructor also has a plan or check sheet which you may use if you desire. See how nearly your group plan compares with the teacher's plan. You may use your own, the teacher's, or the group plan in making your center punch.

Having decided upon the plan you will use, check your drawing and make a stock bill and have them approved by your foreman and the instructor. You may then obtain your stock from the stock foreman and proceed with your work.

Making Your Center Punch

You now have your material and are ready to carry out your plan. Possibly you have not run a lathe before, or have a new operation to learn and require some additional help. You will be able to get this additional information from the "Supplementary Sheets--Unit V - Self-Helps on Lathe Operations." You will find an outline of these self-helps at the desk.

Even though your job is properly set up in the machine, you will not get good results unless your tool-bit or cutting tool is sharpened correctly. If you need help in sharpening your tool-bit, refer to "Supplementary Sheet 4, Unit VIII - How to Grind and Sharpen Tool-Bits."

In event that you do not understand these instructions, be sure and ask for help from some other boy or your teacher.

Provisions for Discussing Your Problems

You may have had trouble in carrying out some of the steps in making your project. How did you solve them? Other students who are working on similar projects will be glad to know. If you have other problems which you could not solve, bring them before the group for suggestions. The instructor will also welcome any suggestions you have for improving this lesson sheet.

How to Appraise Your Project

After each member of the group is finished, compare your center punch with the others. In this way you can discover in which way your work was better or less efficient than that of the other students. This will aid you in discovering a better way of doing these operations. Then appraise your work by comparing it with examples on the appraisal board. If your work is satisfactory, show it to the instructor so that you may receive credit for your work.

References

The following references will help you in learning more about machine-shop methods. You can get these books in the library if those in the shop are in use.

Burghardt's "Machine Tool Operation, Part I and Part II."*
Jones' "Machine-Shop Practice, Book I and Book II."**
Knap's "Machine Shop Practice."***

Other Opportunities

You are now ready to make another tool such as an outside or inside caliper, nail set, hammer, etc., which may be useful to you. Refer to the list of suggestive jobs in Unit I, Lesson 6, "Opportunities in Machine Shop."

* McGraw-Hill Book Co., New York, N. Y. ** The Bruce Publishing Co., Milwaukee, Wis. *** John Wiley & Sons, New York, N. Y.

Lesson Sheet

MACHINE SHOP

DRAWING AND STOCK BILL SHEET

Unit_____ Lesson_____ Course_____

Date_____ Grade or Hour_____ Name_____

Free-Hand Working Drawings

Stock Bill

No. Pieces	Length	Size	Shape	Kind of Material

Approved by_____ Stock issued by_____

Mach. Foreman - Date Stock Foreman - Date

Instructor's O.K._____ Date_____

Drawing and Stock Bill Sheet
Original 8½ by 11 in.

demonstration from some other boy or the teacher.

5. The project completed, the time has come for appraising the center punch and the generalization. Here again the lesson sheet gives directions. There are two phases to this process.

First, he compares his project with those made by the other students. This first phase makes it possible for each boy to profit by the experiences of others, determining ways in which some other boy has used a better technique. This process will issue in constantly improving methods and techniques through conscious control by the boys of the generalizing process. This preliminary discussion provides a background for the class discussion which is to follow.

MACHINE SHOP

INDIVIDUAL PLAN SHEET FOR LATHE PROJECTS

UNIT V - Lathe Lesson_____ Course_____

Date_____ Grade or Hour_____ Name_____

In the space below plan the procedure, step by step, that you will use in making this project.

Order of Operations or Steps	Reasons or Purpose	Order of Operations or Steps	Reasons or Purpose
_____ Straight turn		_____ Make a working drawing (Use Drawing and Stock Bill Sheet)	
_____ Face end or ends		_____ File and polish	
_____ Select steel (kind)		_____ Case harden	
_____ Drill holes (state sizes)		_____ Center the stock	
_____ Cut-off the center holes		_____ Turn eccentrics (state dia.)	
_____ Turn tapers (state size)		_____ Grind (state what and sizes)	
_____ Cut threads (state kind)		_____ Cut bevels and chamfers	
_____ Harden and temper		_____ Cut-off the stock	
_____ Bore and ream holes		_____ Plan the stock bill (Use Drawing and Stock Bill Sheet)	
_____ Knurl (_____)			

Note: When your plan is completed, have it approved by your foreman and the instructor, and then refer to your lesson sheet for further instructions.

Foreman's O.K._____ Date_____ Instructor's O.K._____ Date_____

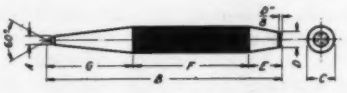
Planning Sheet

MACHINE SHOP I

UNIT V - PROJECTS THAT CAN BE MADE ON THE LATHE LESSON 4 - CHECK SHEET - HOW TO MAKE A CENTER PUNCH

Procedure for Making the Center Punch

1. Make a two-view free-hand working drawing of the center punch on the "Drawing and Stock Bill Sheet". The dimensions for the size you desire can be obtained from the chart on the lesson sheet. You may use the type shown or one of your own design. Your drawing should look like the one below.



2. Select the proper kind of steel for your center punch and fill out the stock bill on the form provided. If you are in doubt about the proper kind of steel to use, refer to Lesson Sheet 2, Unit II, "How to Choose the Correct Steel for Your Projects." Get your steel from the stock foreman.

3. Your next step is to fasten your stock firmly in a three-jaw chuck on your lathe. If you don't know how to run a lathe, refer to Supplementary Sheet 2, Unit V, "The Lathe and Its Principal Parts", and Supplementary Sheet 3, "How to Operate an Engine Lathe." When you understand the principal parts, have the instructor or the shop foreman demonstrate how the lathe is operated.

4. Face and center your stock. If you don't know how to center and face, refer to Supplementary Sheet 5, Unit V.

5. Turn your stock to the proper diameter as far as the lathe dog. If you don't know how to do straight turning on the lathe, refer to Supplementary Sheet 6, Unit V, "How to Do Straight Turning."

6. Knurl the punch as indicated on the drawing. Use a medium knurl. If you don't know how to knurl, see Supplementary Sheet 7, Unit V, "How to Knurl on the Lathe."

7. To cut the taper on the center punch, set the tailstock of the lathe off the center. If you don't know how to cut tapers on the lathe, see Supplementary Sheet 8, Unit V, "How to Turn Inside and Outside Tapers on the Lathe." Then place your work in a vise and saw off the point and centaining the center. If you do not understand how to use the hand hack saw, see Supplementary Sheet 6, Unit III, "How to Use a Hand Hack Saw."

8. Fasten the opposite end of your work in a three-jaw chuck and cut off the center hole on the head.

9. Turn off the rough end of the stock and form the head.

10. File and polish both ends of the punch. File the end to a 60-deg. point. If you don't know how to file and polish in the lathe, see Supplementary Sheet 9, Unit V, "How to File and Polish on the Lathe."

11. Harden the punch in the Heat Treating Furnace. If you don't know how to harden and temper tool steel, see Lesson 4, Unit IV, "How to Anneal, Harden, and Temper Steel."

12. Polish your punch again in the lathe.

13. Set the suggestions in Part III in your Lesson Sheet for discussing your problems, and in Part IV for appraising your center punch.

Checking Sheet

with the particular processes with which he is not familiar. With adequate illustrations and clear descriptions they are adequate in most instances, but frequently it will be necessary for the boy to request a

Second, The boy compares his work with the samples on the appraisal scale and decides whether his work is satisfactory or unsatisfactory.

(To be Continued)

Industrial Education and Change

Clyde A. Bowman

Dean, School of Industrial Education,
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(Continued from July)

Area No. 1

What the Teacher Does

In this area the action of the teacher is his teaching activity with the pupils. He must determine which method of teaching to use. He, with the pupils coöperating, identifies the *purpose* of the lesson. In his plan he recognizes in the *preparation* step in the lesson, the necessity for bringing into circulation in the minds of the pupils that which they already know and can do, which is a definite part of the purpose of the lesson. In the *presentation* step in the lesson, the new material comes into circulation through the demonstration and the various teaching uses of the learning process. In the *application,* the applications of the new acquisitions and the new significances of old acquisitions are identified. Modifications of this range of the lesson are made as the teaching situations vary. In the action of the teacher in Area 1, the combination of phase and level is the teaching lesson.

Technique or Procedure

Sound pedagogy must be used. Efficient instructional practice must be carried on in efficient surroundings.

Must Know or Possess

The factors listed here are those which make up the teacher's professional and social personality. They are the possessions which are used in his pedagogical technique in carrying on his teaching activity.

Change

In his plan of teaching, the industrial teacher should be very much aware of the developments in modern pedagogy in connection with the contract system and pupil participation in the formulation of lesson purposes. The recognition that pupil performance in a subject resulting in acquisition of knowledge and skills and contributing to the development of ideas, character, and social efficiency, is at its best when the result of a challenge is significant in his teaching action. Pupil participation in the shop management and operation now becomes a vital part of the opportunities.

Area No. 2

What the Teacher Does

Participates in the selection of the job or lesson and the selection of new content.

Technique or Procedure

A tangible procedure for weighing possible content for instructional use is sometimes difficult. The standards of measurement must fit our changing civilization. Kilpatrick's frequency, significance, economy, and availability help in identifying the procedure in selection. In selecting from many possibilities those which are most common, those which are most frequent, are possessed of significant moment and content, which do not incur excessive cost in money, space, time and material, which are of prime importance, and which are least likely to be available outside of school, will be selected. The significance may be expanded in the formulation of three levels of instructional material.

Must Know or Possess

There must be a clean-cut, accurate, pupil analysis to include an adequate understanding of pupil ability, pupil objectives, pupil time, and pupil equipment to result in appropriate selections for teaching.

Change

The industrial teacher should be acquainted with the significance of pupil challenges growing out of group discussions. In his acceptance of the modern recognition of freedom in education for the pupil, he should realize that this implies:

A. Freedom in the choice of a method or specific means through which he learns.

B. Freedom in the choice of subject-matter content in kind, type, and quantity.

He should recognize that some pupil latitude is advisable in A and that some pupil latitude is advisable in B above and beyond certain required minimums. The experience of adults should be capitalized in the determination of the self-defense necessities in establishing the minimum for the pupils.

In the teacher's action in participating in the selection of a job or lesson, he must utilize modern educational philosophy

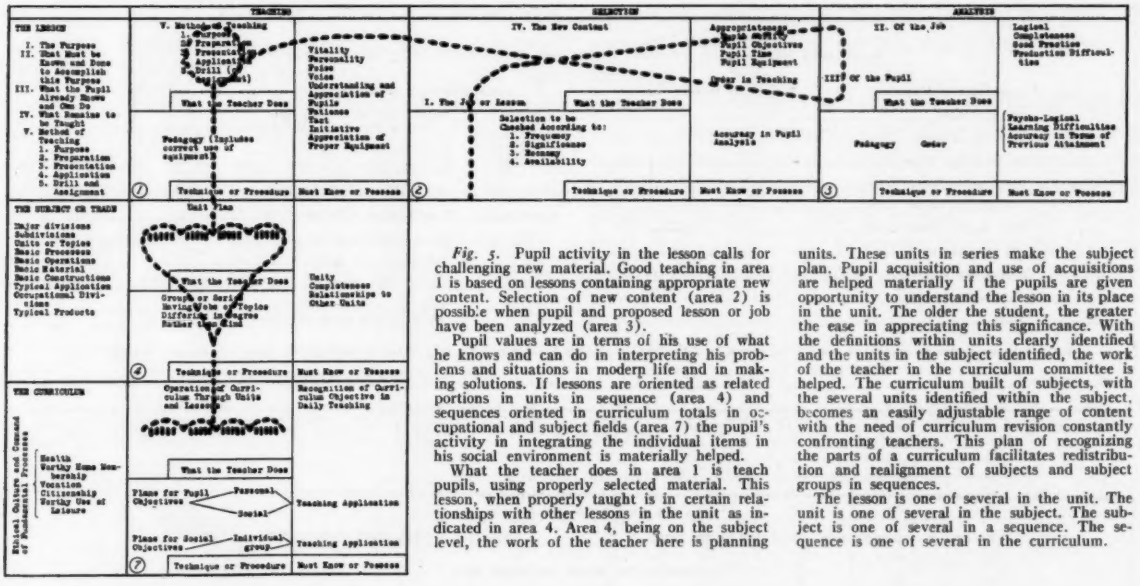


Fig. 5. Pupil activity in the lesson calls for challenging new material. Good teaching in area 1 is based on lessons containing appropriate new content. Selection of new content (area 2) is possible when pupil and proposed lesson or job have been analyzed (area 3).

Pupil values are in terms of his use of what he knows and can do in interpreting his problems and situations in modern life and in making solutions. If lessons are oriented as related portions in units in sequence (area 4) and sequences oriented in curriculum totals in occupational and subject fields (area 7) the pupil's activity in integrating the individual items in his social environment is materially helped.

What the teacher does in area 1 is teach pupils, using properly selected material. This lesson, when properly taught is in certain relationships with other lessons in the unit as indicated in area 4. Area 4, being on the subject level, the work of the teacher here is planning units. These units in series make the subject plan. Pupil acquisition and use of acquisitions are helped materially if the pupils are given opportunity to understand the lesson in its place in the unit. The older the student, the greater the ease in appreciating this significance. With the definitions within units clearly identified and the units in the subject identified, the work of the teacher in the curriculum committee is helped. The curriculum built of subjects, with the several units identified within the subject, becomes an easily adjustable range of content with the need of curriculum revision constantly confronting teachers. This plan of recognizing the parts of a curriculum facilitates redistribution and realignment of subjects and subject groups in sequences.

The lesson is one of several in the unit. The unit is one of several in the subject. The subject is one of several in a sequence. The sequence is one of several in the curriculum.

in determining the minimums for pupils in number, kinds, and types of basic elements to be included in the selection for all pupils.

Area No. 3

What the Teacher Does

The teacher in performing steps II and III of the lesson planning is first analyzing the job or lesson to be taught to arrive at a definite identification of what must be known and done to accomplish the purpose. He is also analyzing the pupil who is to accomplish this purpose identifying those things which are in the lesson which the pupil already has acquired. The action is the *analysis of the lesson* in terms of the *content* and of the *pupils* who are to make the accomplishment.

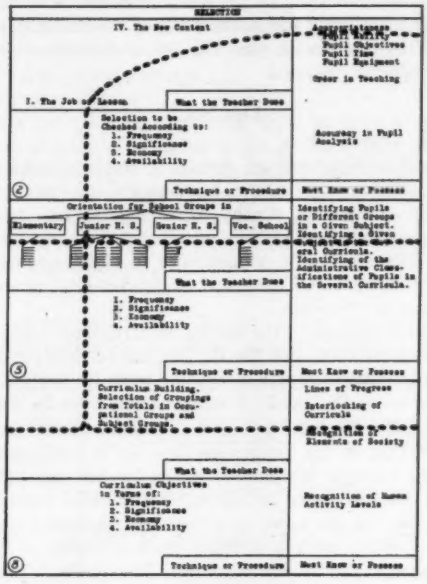


Fig. 6. The lessons or jobs made available for pupil participation (area 2) grow out of the orientation of pupils in purpose, progress, and ability groupings. (Area 5.) These groupings become possible through pupil identification as a result of his use of the available educational opportunities and lines of progress. (Area 8.)

Selection on the lesson level is concerned with the selection of new content and before that, the selection of the lesson itself. This is built on the work of selection in area 5. The lesson has its related place in the unit. The unit has been identified in its place in the subject in area 4. In area 4 the teaching plan of the subject has been made. In area 5 the selection of units is in terms of people in the school and in terms of content. Purpose, progress and ability classifications indicate the basis on which units are selected with the content analysis in area 6 serving as the source material.

The operation and revision of curriculum avenues of educational travel is based upon the selection of routes in area 8. This work of selection of avenues is based on plans for people in our current civilization worked out in terms of their needs as indicated in area 7 and analyses of large related fields of content as indicated in area 9.

Broad areas in the curriculum level being brought to a closer focus in subjects and pupil groups in the subject level, and still sharper in focus in the lesson level, selection is a significant phase of educational activity.

Technique or Procedure

As a guide in his analysis he must be able to look ahead to the pedagogical technique which he will use in teaching the material analyzed.

Must Know or Possess

As a basis the teacher must be well informed as to the content on a logical basis of analysis. A knowledge sufficient to indicate completeness must be his. He must know modern good practice and must be aware of modern production difficulties. He must know when a logical classification is psychological.

Change

In his activity in analyzing the job or lesson which is up for immediate consideration, he should be in possession of specific knowledge on modern good practice. He should keep himself thoroughly aware of the progressive changes in content in the various jobs included in the work assignments for the students in his shop and drawing projects. The teacher should include some provision in his plan of analysis for pupil opportunity for discovering the locations of pupil needs for new acquisitions and experiences.

Area No. 4

What the Teacher Does

The teacher's actual activity in this point is the *arrangement* of the subject, trade, or occupation *into teaching units.*

Technique or Procedure

In the identification of units of instructional material the designation of units is assisted when the unit is regarded as made up of jobs or topics which differ in degree rather than kind.

Must Know or Possess

The teacher must be able to identify clearly the boundaries of a unit of instruction content as well as identify its relationship with other groups.

Change

Rapid strides have been taking place in the instructional use of purpose, ability, and progress classifications of students. These have resulted in modifications in content range to be represented in instructional units. (See Fig. 7.) The teacher must regard the unit plan as a means. It is the device which provides an arrangement which enables the teacher to *identify, classify,* and *orient* the individual members or factors in the steady procession of new situations and problems resulting from change.

Area No. 5

What the Teacher Does

The work of the teacher in selecting units is in reality orienting units of instructional material in terms of the needs and requirements of pupils. The activity of the teacher here is the *selecting of instructional material* in terms of the needs and requirements of the *educational travel* of human beings as well as the sequence requirements within the subject or trade.

Technique or Procedure

The procedure here carries similarity with that in Area 2 but deals with units rather than lessons.

Must Know or Possess

The teacher must understand the significance of identifying pupils of definite groups in a given subject, of identifying a given subject in the curricula, and of identifying the various administrative classifications of pupils in the curriculum. The purpose classifications, ability classifications, and progress classifications must be understood.

Change

Some years ago the I.Q. was hailed as the solution for the problem of homogeneous grouping of pupils. Now we note the rapid development of challenges and reëvaluations of its significance. The identification of purpose classifications, progress classifications, and ability classifications, is going through rapid development. The industrial teacher may well carry on active study for the purpose of keeping pace with the situations and actions referred to in this area. Figure 7 indicates in condensed form the variations of mixed instructional groups now coming to industrial teachers. The advancements in the use of tests in formulating classifications of students is producing change. The progressive possibilities of the work of such agencies as the Employment Stabilization Research Institute of Minneapolis, carry much of significance to the industrial educator in the determination of student selections and student work assignments.

Area No. 6

What the Teacher Does

The actual activity of the teacher in Area 6 is to analyze the total in the trade or occupation or the total subject content.

Technique or Procedure

In making and recording the analysis the teacher must use

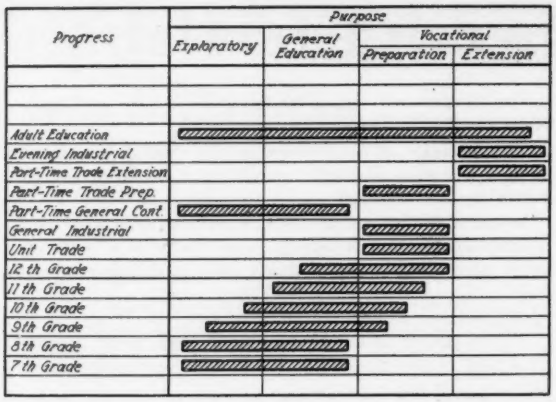


Fig. 7. Successive identifications of the pupil may be made in terms of his progress and purpose. Ability is a factor in both and is a factor in his classification when purpose and progress are plotted to join each other.

a procedure which will result in a record easily accessible for selection for the various types of pupils who will legitimately present themselves for instruction in certain portions of the total scope of the material. This analysis procedure when applied to an occupation must be in such form as will fit the demands of the occupation and be arranged in unit form to fit the opportunities which pupils have for learning. The form of analysis in the case of the subject should be such as will later be convenient for the selection of units appropriate for the school groups coming for instruction and which will make the greatest contribution to interpretive use in life.

Must Know or Possess

In order that the analysis of the occupation or the analysis of the subject may be sufficiently complete and in proper form for educational use the teacher must be aware of the breadth as indicated. As he, as a teacher, is representing an occupation, he must know its location by establishments, its distribution by workers, its results by products, its work by construction, its content by units and basic processes or operations. These he must be able to translate through typical jobs. As a teacher representing a subject he must know its major divisions and subdivisions, the units and topics.

Change

For the industrial teachers the occupations serve as source areas for a large amount of instructional material. Redistributions in the occupations of kinds of establishments, new definitions of occupations resulting in new kinds of workers, the development of new products resulting in the need for new instructions, all produce constant change in the source material. These naturally result in new definitions of units. Some basic processes become obsolete and new ones come in. Basic things done in certain occupations are combined in new arrangements as new jobs appear.

In the teacher's analysis of his source material he must so record it as to make it accessible for selection for any legitimate pupil classification in terms of purpose, ability, and progress. His analysis should be so built as to meet the following considerations:

The occupational content included should be correct in individual classifications and in the relationships between them.

The purpose, ability, and progress classifications of the pupils should be correct in individual members and in groupings.

The mechanical form of the analysis should be such as will aid in the identifying and interpreting of the changing civilization and the formulation (see Fig. 18) of educational solution of the problems disclosed.

Area No. 7

What the Teacher Does

The teacher's activity in Area 7 is teaching units making definite contribution to the development of the individual along lines of health, worthy home membership, vocational preparation and participation, citizenship, and worthy use of leisure. These are to be permeated by a definite development of ethical culture and command of fundamental processes.

Technique or Procedure

The work purpose of the teacher in curriculum planning and curriculum interpretation for the purpose of carrying out curriculum objectives in actual teaching must be twofold. In his contribution to the *pupil's development* he must be guided by a sound code of ethics applicable to modern conditions. In his interpretation of this application he must be well prepared to assist the pupil in his plan of living for his personal affairs and his plan of living in his individual social participation. Second, the teacher must be a thorough, interpretive student of *social needs* with a working understanding of the part which groups play in *social service*. The teacher's procedure in curriculum operation must be characterized by active, continuous recognition of these two controls.

Must Know or Possess

No limit can be placed on what the teacher must know in this area. He must understand what characterizes a good plan of living. He must understand the manner in which the curriculum identifies this plan and translates it into educational objectives and sets up lines of educational travel to bring balanced development to insure proper membership in our present civilization.

Change

The teacher must keep himself continuously conversant with modern conceptions of education and what it is doing. The rapid changes in social conditions bring with them new requirements for the teacher. If the teacher endeavors to do his part in the curriculum in making contributions to the balanced development of the individual, he must also keep the needs of society clearly in mind. The development of adult education is bringing new problems to the teachers at a rapid rate. The needs in adult education which are becoming apparent are indications, in many instances, of the shortages in the education of young people. Whatever the situation, the educator must identify, interpret, and educationally solve.

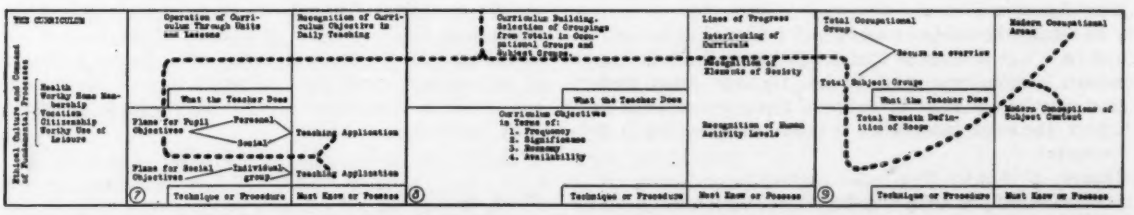


Fig. 8. The educational opportunities and avenues of progress (area 8) are built upon the results of social interpretation (area 7) and the analysis of total fields of content (area 9).

Curriculum building, as the foundation of well-made selections of educational travel (see Fig. 6) involves continuous study and investigation. The determination of what shall be in the curriculum, how and when it shall be available for students, is a constant activity.

The curriculum building itself is based upon a study of the content in our current civilization in area 9. It is based upon the actual operation of the curriculum for people and for society in area 7. Constant study of the operating curriculum in area 7 and constant study of the changing content of American civilization in area 9 brings the material which is used in the constant revision of curriculum avenues in education to enable the individual to make his progress as an individual and as a member of society.

Area No. 8

What the Teacher Does

The teacher's actual work in Area 8 is participation in the planning of opportunities and avenues of developmental progress for young people and adults. In this, the total content in occupational groups and subject groups is used as the source. Curriculum committee work here is never finished.

Technique or Procedure

The characteristics here are similar to those in Areas 5 and 2, with the added breadth of application resulting from the work in selecting large groups.

Must Know or Possess

The teacher must be acquainted with the lines of progress or educational travel available in the school system. He must understand and be able to identify the interrelationships which exist between these lines. He must be able to recognize the outstanding requirements of society, be able to interpret these, and to show the leads through the several lines of available educational travel.

Change

New conceptions in Area 7 result in the necessity of continuous reconstruction in Area 8. In the Schedule of High School Supervision Conferences for 1932, issued by the State Department of Public Instruction for Wisconsin, two paragraphs are of significance to the industrial teacher in aiding him to sense the factors of change in his particular situation:

"*A New Statement of Educational Philosophy.* Every supervisor and teacher in the state should become familiar with the statement of educational philosophy in the January, 1932, issue of the *Wisconsin Journal of Education*. It proposes a shift from the idea of education as adjustment to the institution, in an autocratic school, through indoctrination in the culture mass, to the idea of education as growth in control of the institution, in a democratic school, through a problem-solving curriculum. Such a shift would necessitate a radical modification of the present high-school organization, curriculum, and method of instruction."

"*The Curriculum.* The reorganization of the curriculum must be made in the light of an accepted theory of education. The latter is based partly on scientific research and partly on approved philosophy. Our educational psychology is coming to rest on sound experimental data; our educational philosophy, however, still must harmonize such conflicting ideas as equality and liberty. One of our most difficult questions is to decide whether the high-school curriculum can be revised or must be organized to conform to our new theory of education. Since it is evident that much of our present difficulty comes from overspecialization, one remedy lies in a greater integration of courses and departments. Can this integration be achieved on the basis of a new problem-solving curriculum?

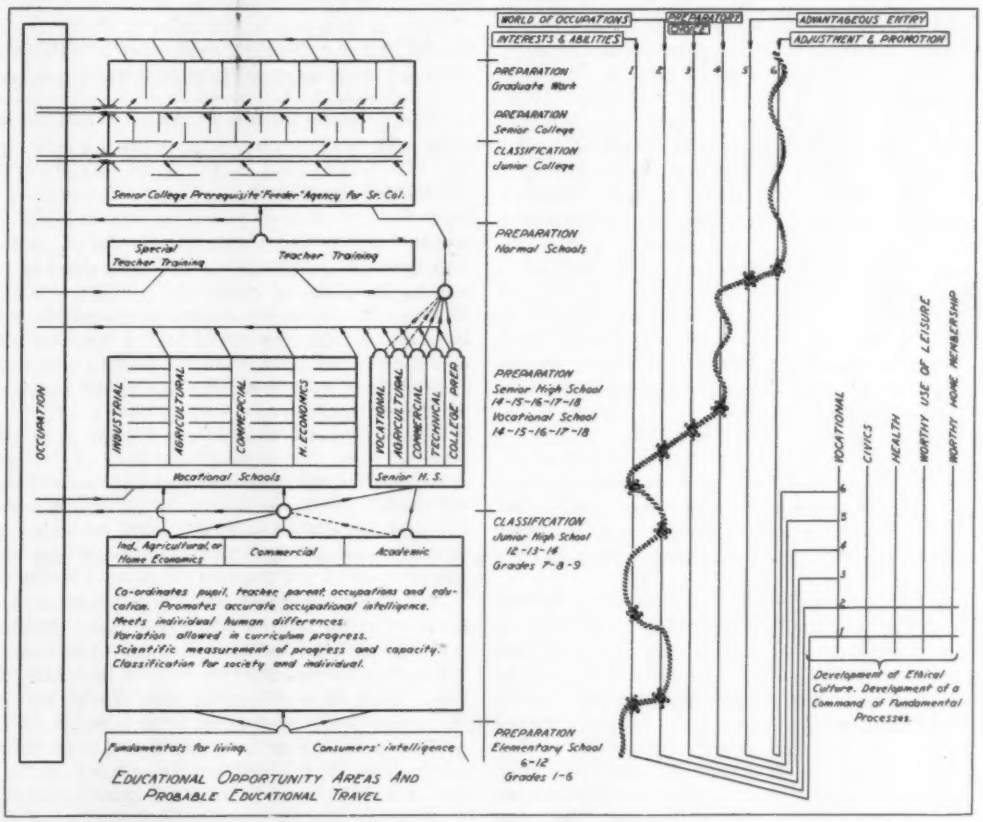


Fig. 18. Exploration and progress in the modern school lead into the occupational world. Exploration and progress in the occupational world lead into the modern school. Vocational progress for the individual, therefore, to be completely identified and recorded, must be in terms of educational travel and vocational travel. Figure 18 aids the counsellor and the student to identify individual advance in terms of educational and vocational progress. At the left is a condensed highway map of main routes of educational travel. At the right is a condensed graph recognizing the cardinal principles of secondary education. The development of a command of fundamental processes and the development of ethical culture are identified as factors in the development of the individual underlying all development. The vocational development, the civic development, health development, development of a worthy use of leisure and development of worthy home membership, are indicated as the five lines of balanced development which must be carried forward based upon the other two, if the individual is to live his life as an individual and as a member of society. The steps in the line of development of vocational progress have been clearly identified by Dr. Brewer of Harvard University as follows:

1. He must study his interests and abilities.
2. He must study the world of occupations.
3. He must choose a vocation.
4. He must prepare for the vocation.
5. He must make advantageous entry.
6. He must secure adjustment and promotion to insure the American standard of living.

In the center, these six steps are identified by the vertical lines. Located on these lines, the individual's action in taking these steps may be placed opposite the location in education at the time the step was taken. In the above, for instance, it is assumed that the individual continued on into the senior high school still in steps 1 and 2 in his vocational progress. It is assumed in this case that in the senior high school he made his choice of a vocation and following this began his preparation. It is assumed that he entered the vocation after completing the senior high school. It is assumed that he began securing adjustment and promotion and has continued therein.

The many excursions into incidental employment, the changes in vocational objectives, with the resulting need for preparation, and many other ramifications of educational and vocational travel may be plotted on this graph with astonishing clearness. Steps 1 and 2 of the individual's progress are indicated as contributing distinctly to his general education.

Would such a curriculum also solve the problem of transfer?"

Industrial arts and industrial education play an important part in the progressive development of the individual. Figure 7 illustrates this point. Besides the general educational values of industrial education, it is necessary that the industrial teacher understand clearly the manner in which the work contributes to the vocational progress of the individual. As identified by Dr. Brewer of Harvard University, the steps in the vocational progress of the individual are as follows:

1. The study of interests and abilities.
2. A study of the world of occupations.
3. A choice of a vocation.
4. Preparation.
5. Advantageous entry.
6. Adjustment and promotion.

Area No. 9

What the Teacher Does

The work of the teacher in Area 9 is the identification of the divisions in the occupational group or the divisions in the subject group in sufficient detail to render the totals available for the work in Area 8.

Technique or Procedure

In identifying this total scope or breadth the procedure in recording the total should look ahead to the use to be made of the analysis when the work in Area 8 is carried on.

Must Know or Possess

The teacher must see clearly the range of content in either the occupational group or the subject group which he represents.

Change

Changing technology with a resulting realignment of occupations within occupational groups calls for constant study. Integration of such divisions formerly sharply divided one from the other, brings the necessity for constant identification study on the part of the teacher. This is to insure a clear understanding on his part, of the factors or divisions, or parts in the source areas of his instructional material. It is necessary, also, in order that he may clearly understand the relationships existing between these individual members.

Speaking the Language

D. C. Marshall

Junior High School,
Manhattan, Kansas

The boy who knows the right names of the tools and materials which he uses, and of the articles which he makes, has acquired something very much worth while from his school shopwork.

DO YOUR students come to you and ask for the doo-dad that holds the dingus on, and if so, what do you do about it? A hardware dealer recently told the writer that nine out of ten people that come into his store don't know how to ask for what they want. It is a very important part of the teacher's work to see that his students learn the names of all of the items which they use or with which they come in contact in his shop. It is, furthermore, important that he sees to it that they become sufficiently familiar with these terms so that they can use them intelligently, because this by-product of their shopwork not only broadens their vocabulary but increases their self-confidence.

This phase of the related subjects work may be divided into: the vocabulary of tools, of hardware, of finishes, and of project parts. When the student begins his study of tools as a part of his shop course, he should be required to learn and use the correct names; not some name that the instructor has given them, but the name under which the manufacturer markets them.

A group of boys who had finished the work in the writer's class and had gone into another department, came back to him, very much excited, a short while after. They told him that they had been given an identification test of tools and that they had used the tool names which they had learned in his class, but that many of these names had been marked wrong. The boys felt that he had been wrong and that they were justified in calling him to account. To settle the matter, a tool catalog was consulted and each item checked, with the outcome that the names which the boys had used in the test were all found to be correct. The writer does not know how the other instructor squared himself with the boys, but the situation must have been quite embarrassing for him.

The boy who knows the names of the parts of a tool and how each piece functions as a part of the whole, has gone a long way toward an intelligent mastery of its use, and it will not be necessary for him to come to the teacher with the words, "This hickey came off and I don't know where it belongs."

Where hardware and furniture fittings are used, it is not out of reason to expect the student to know the names of the common articles usually found in the home. It is not necessary for him to memorize the decimal sizes of the various screws, but if he knows what number will fit a 3/16- or a ⅛-inch hole, and perhaps one or two other sizes, he will have a working knowledge of screws that will help him a great deal. There are not so many of these items that he will have to learn. Besides this, he should have a speaking acquaintance with the different sizes of hinges, catches, bolts, nails, hooks, etc. Once having acquired them, he will find a great deal of use for the knowledge.

When a project is assembled and ready to be taken to the finishing room, the student is again ready to increase his vocabulary, at the same time that his senses of smell, sight, and touch are being trained in the use of new materials. The boy who asks for wood filler is much better instructed than the one who asks for "that gooey stuff that is used for filling."

Perhaps the students learn least of all about the names of the parts of the projects which they make. This weakness is first noticed when the student starts to fill out the bill of material on his job card. Since tables have rails, chairs have splats, doors have stiles, and other articles have stretchers, the student should be required to know the names of the parts which he is making and he should be able to use them. A gentle insistence on the fact that everything has a correct name and that that name should be used, will make industrial-arts work much more satisfactory to both the student and the instructor.

The boy who is sent back to his bench to find out the name of what he wants, will not rashly approach the instructor again unprepared, and it will soon be noticed that there are fewer "dinguses" and "what-you-call'ems" in the school shop.

—◎—

EQUAL OPPORTUNITIES FOR ALL

I should like to see every boy and girl in the land have a fair chance to obtain an education. This is not the time to turn ambitious boys and girls out of school to drift aimlessly until it is too late to prepare for life's work. — *Daniel A. Reed.*

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

J. J. Metz, Editor

Sympathy from Abroad

Recently an English correspondent sent such a fine, sympathetic letter with reference to the condition in which the teachers of industrial arts and vocational education find themselves in this country, that we take the liberty of quoting some parts of it for the benefit of our readers. Sympathy, when offered in a manly way, usually has the effect of making one a little more satisfied with the conditions which aroused the sympathy. And when it comes from one who is even less fortunately situated than a recipient, it is still more effective and more welcome.

This English correspondent writes as follows:

I would dearly love to see for myself the wonderful school shops that you have and which I have seen only in pictures. Practical education is being boomed here in certain quarters, but there is no more money forthcoming than there was when it was not being boomed, and the teacher of handicraft is no better paid now than he was before. There is no chance whatever of promotion; so that, without the enthusiasm that we seem somehow to keep going, I don't know where we should be. In our local branch of the Institute of Handicraft Teachers, we often get a 100 per cent attendance, which is a remarkable thing, as many of the men have to come long distances. The other branches of the profession cannot reach anywhere near that.

Once when I was in France during the war, in the Forest of Rheims, when neither we nor Jerry knew exactly where the other was, I was walking alone along a road through the forest, my mind anywhere but in France. I suddenly became aware that I was in the line of a machine-gun barrage, the bullets spitting all around me on the rough road. I glanced at the very shallow ditch and wondered if I could get down there for shelter, but it struck me that there was no more protection in the ditch than I was having on the road. Moreover, I was so fed up that I did not care very much whether I was hit or not, and I decided to go on about another quarter of a mile to where I had in the morning dug a shallow hollow in which to sleep. The bullets rained about me, and . . . I was not touched.

In reading your description of the present state of affairs in the educational world of your country, I cannot but think that you are much in the same state that I was on that walk through the Forest of Rheims. And I cannot also but think that at the end, you will come out of it all as I did, unscathed, and live after it to smile at the knocking of the knees which nothing on earth can stop, just as I did. I am smiling now. I can feel that oscillation of the knees; I can feel that "What the hell are you doing, Cliff?"; I can feel that "Good-bye, Cis (the correspondent's wife), you will surely be a war widow tonight!"; I can feel that sense of helplessness at not being able to tell from whence the bullets were coming, so that at least I could have a knock back; but I reached the little dug-out, and five minutes after I had got in it, I was fast asleep. I had been on duty continuously for 36 hours, and I needed no rocking.

You will get over it; you will laugh at the trials which are so formidable at the moment. All these things come so that we can show what stuff we are made of. And you can do it.

That the writer's condition is not such an enviable one is shown by another statement which he makes later on in his letter. He refers to the difference in the monetary returns from teaching existing between his country and ours by stating that two years ago three American teachers were visiting England for three months, and ends up with the statement that none of his teacher friends could afford to visit America for even a month. The only exception that he knew of was a man who had been able to visit America for that length of time, but only because he had enough friends with whom he was able to stay so that his expenses were kept down to a minimum.

It is well to get this bit of sympathy and the refreshing philosophy which it contains. The American educational system will get over it. Industry and business already are showing signs of improvement. Education, too, will follow, and the outlook which may be dark and dismal at present will again be brighter. The American teacher, as his English fellow workers, must look hopefully into the future, and in the meantime with true missionary and pioneering fortitude and ingenuity continue so that the youth of our country and of the world will not suffer irreparable damage because of the frightful dilemma into which human greed, heartlessness, and short-sightedness have plunged the world.

Industrial Recovery Bill and the School Shop

The far-sighted policy which underlies the Industrial Recovery Bill also will have its effect on the school shop, and its effect here, we hope, will be as beneficial as indications are that it will be elsewhere. For the school shop it will mean that the individual firms who have spent time and thought and money in developing materials, tools, and equipment specially adaptable to the school shop, will at last get the protection which their initiative and far-sightedness deserve, but which up to now has not been accorded them. No longer will it be possible for irresponsible manufacturers and distributors to foist their cheaply made imitations on the school. It is true, this will mean a rise in prices, but the school buyer will have the assurance that what he buys will be as it is represented and that it will stand up for the service for which it has been manufactured and bought.

The New Deal for the School

The dawn of better times which is slowly breaking over the business and industrial world carries with it a fair promise for the betterment of the school. It may be quite probable, however, that the effect of the *new deal* in the school field will not be felt quite as rapidly as in industry. The economic disturbances affected business for almost a year before it put its blighting finger on the school, and it is quite probable also that the betterment in the commercial and industrial world will have progressed for some time before the same effects will be felt in the school.

The schools, however, can again look hopefully into the future, for it is inconceivable that when America again gets into its forward stride it should forget the education of its youth.

Problems and Projects

PEWTER STATIONERY RACK

Emerson Wm. Manzer, Bronxville, New York

The pewter stationery rack is a good project for the development of right-angled soldering. Use two pieces of wood for this operation because wood is a poor conductor of heat. Place several snippets of 50–50 or 70–30 solder along the seam as pilots. When the blowpipe flame melts these pilots, run a long piece of solder along the seam to finish the job of soldering. Do not use too much solder. Watch carefully and you will observe the solder flowing along the seam following the heat.

Use nitric acid for the etching mordant or mix a solution of perchloride of iron and water. Shellac may be used in place of the paraffin as an etching ground. A mixture of beeswax, small amount of pitch, and a quantity of gum mastic will also provide a good etching ground. Melt the gum mastic before adding the wax and the pitch. Experiment with this mixture in order to get the right consistency.

To apply paraffin to the metal, heat the paraffin until it melts, then heat the metal slightly. Use a small brush to paint the paraffin on the metal. Remove the paraffin from the part of the design that is to be etched by using a straightedge and a sharp stick with a thin chisel edge. Be sure that all the paraffin is removed.

The ridge around the design is built up by applying the hot or warm paraffin to the edge of the design and then pushing it to form the ridge. Make the ridge about ¼ in. high. Be sure to cover all of the metal.

Instruction Sheet for Stationery Rack

Procedure:

1. Read required references before starting design.
2. Draw five original sketches and get instructor's approval. Avoid fine lines.
3. Make full-sized layout of accepted sketch. Use drawing board, T square, and triangles, and cross-section paper.
4. Cut metal to drawing specifications. Use 16-gauge pewter, 18-gauge copper or bronze.
5. Clean the metal with fine old emery cloth to remove scratches. Finish with 3/0 steel wool.
6. Transfer design of contour enrichment to the front part.
7. Clamp front and back together. Saw contour outline with a jeweler's saw. File and buff all edges.
8. Transfer design and border to front of rack. This must be done very accurately.
9. Melt a quantity of paraffin in a small pan. While warm, paint on the design using a small brush. Keep metal and paraffin warm.
10. Remove surplus paraffin from outline of design using small piece of wood with sharp, thin edge.
11. Place metal on a smooth board and build up a ridge ¼ in. high around the edge of the metal.
12. Pour etching mordant over the metal and let the etching process take place until the design is thoroughly etched.
13. Pour off mordant into jar. Wash metal in clean, cold water. Do not let etching solution come in contact with hands or clothing. It is injurious.
14. Remove paraffin by washing metal in hot water. Wipe off with clean soft rag and examine results.
15. Solder back and bottom using 70–30 pewter solder. Set up for this job as shown in Figure 1. Use direct method with mouth blowpipe, and a medium flame.
16. Solder front to bottom, using 70–30 pewter solder, as shown in Figure 1. Use direct method with mouth blowpipe, medium flame. Wire parts together and solder all joints at the same heating, using silver solder if copper or bronze has been used.
17. Wash and cool in cold water.
18. Finish with fine steel wool, and lacquer with clear lacquer.
19. Weigh material and record it on the material card.
20. Evaluate your work. How could you improve your project if you made another?
21. Have a classmate criticize your project.
22. Submit to instructor for grade.

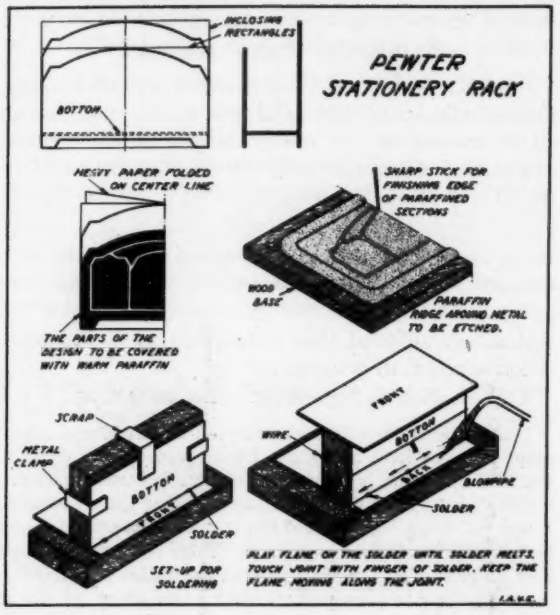
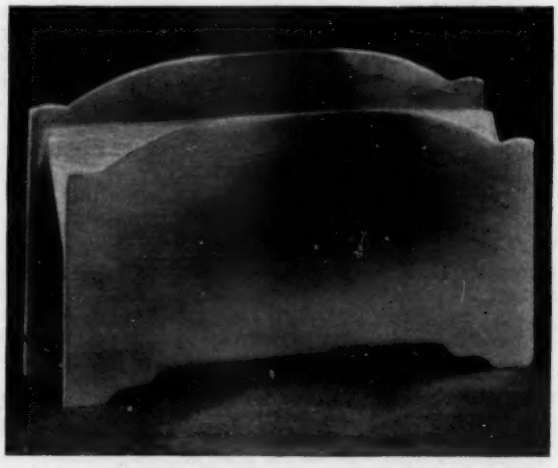


Fig. 1

Required Reference Readings

Technical Information:

Metal Work and Etching, by Adams — "Stationery Rack," pp. 14, 23 to 26. Popular Mechanics Magazine, Chicago, Ill.



Stationery Rack — no etching

Metalcraft and Jewelry, by Kronquist — "Stationery Rack," p. 149. The Manual Arts Press, Peoria, Ill.

Art Metal Work, by Payne — "Copper," Chapter III. The Manual Arts Press, Peoria, Ill.

Alloys of Copper, Chapter IV.

Related Information:

Early American Craftsman, by Dyer. D. Appleton-Century Company, 35 West 32nd St., New York, N. Y.

Paul Revere, Chapter VIII.

SOMETHING NEW IN ORNAMENTAL CONCRETE

E. G. Livingston, Assistant Professor of Industrial Arts, Iowa State College, Ames, Iowa

In the May, 1933, issue of this magazine the method of casting artificial-marble hot-dish tiles, clock cases, and book ends was thoroughly explained. Those who have followed these directions will be ready to go ahead with another phase of the work which is herewith described.

Ornamental Concrete — Lamp, book ends, bowls, and plates turned out on the lathe

An inquisitive turn of mind led to the attempt to turn artificial marble in the wood-turning lathe. The result was far beyond expectation. As a material for use in the turning lathe, Keene's cement has much to recommend it. It is much cheaper than any wood. Designs are easier to execute because the material cuts more easily than any wood either when scraping or cutting. Actually the tools do not dull as quickly as when used turning wood. There are no chips to fly and endanger sight. The finishing operation is quite simple, for only a little fine sanding is needed. The finished product is a novel article resembling marble which attracts everyone's attention and admiration. Pupils who are too young to operate a lathe may safely and successfully turn simple artificial marble articles.

To prepare the material for turning proceed as follows:

1. Cut a circular piece of ¼-in. plywood to a diameter slightly larger than that of the finished product.

2. Fasten the plywood to a faceplate with at least four screws, allowing the screws to extend ⅜ in. through the wood. This is for the purpose of holding the cement to the faceplate.

3. Cut a strip of cardboard wide enough to give the desired depth to the project and fasten it to the plywood with tacks. Additional stability may be secured by tying a piece of cord around the cardboard form near the top.

4. It would be well to give the plywood a coat of lacquer, but the cardboard needs no "dope."

5. Now proceed to mix the batch according to instructions given in the May issue of this magazine and fill the mold. Since the exposed surface dries more quickly than the rest, it is wise to cover it with a damp cloth.

6. Allow the cement to set for about 24 hours, then tear off the cardboard, fasten the faceplate on the lathe, and proceed as in turning wood. The material probably will not stand as much centrifugal force as wood, but it works quite well at a slow speed.

7. When all cutting is done, it is necessary to allow the piece to become almost dry before sanding and polishing. Only the finest sandpaper should be used.

8. The polishing is done with a piece of cloth while the piece is revolving.

9. Remove the article from the faceplate by carefully backing out the screws. The plywood faceplate may be used again and again.

10. A piece of felt or blotting paper may be glued to the bottom of the finished piece when the cement is thoroughly dry.

The stem of the table lamp shown in Figure 1 was cast in a cylinder made of galvanized iron. A piece of ⅛-in. pipe is placed in the center of the stem and extends far enough at the top to receive a socket, and at the bottom so that the base may be held in place with a rubber washer and a nut. A circular piece of wood, with a hole bored in the center for the pipe referred to in the foregoing, is fitted in each end of the sheet-metal cylinder. These wooden plugs are held in place with screws through the metal cylinder. An impression is made in the block that is to receive the driving center of the lathe. Two screws are then put into this block so that they extend about ½ in. to drive the cement casting. The form must be filled carefuly to avoid air holes. To do this, pour in only a small amount of cement at a time, and then shake down well.

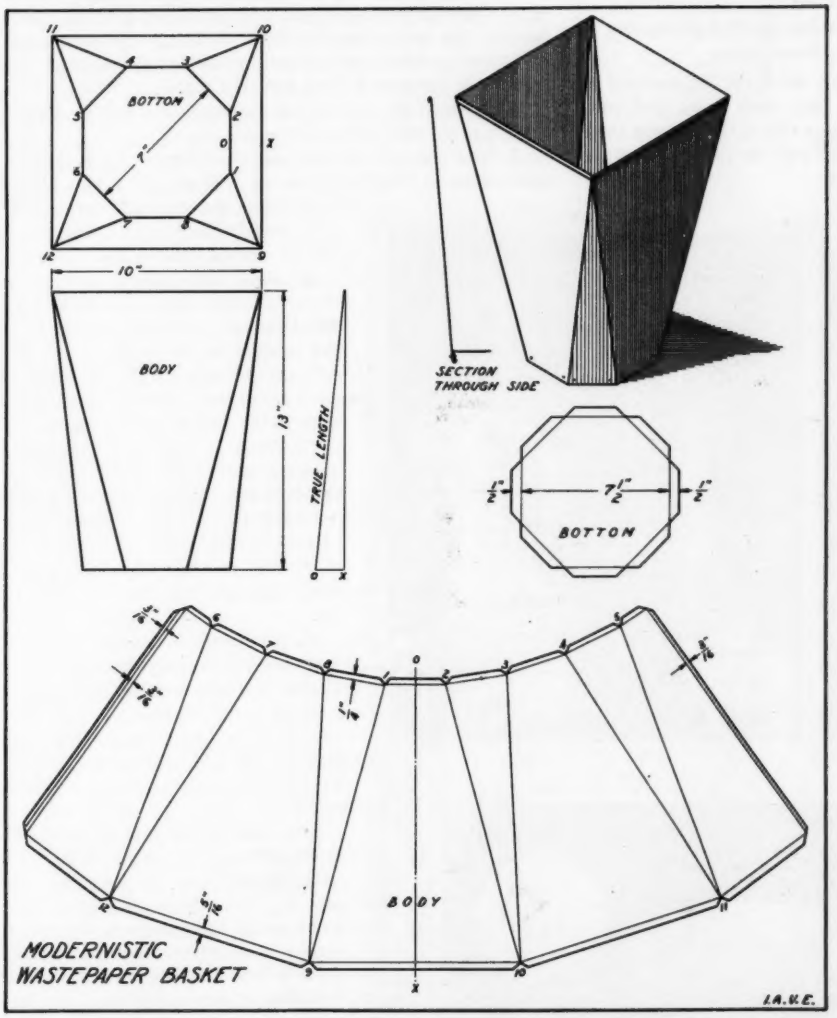
The turned part of the book ends shown in Figure 2 was cast in a sheet-metal cylinder with a circle of wood in each end. After the turning was completed the piece was sawed in half in the band saw and fluted by hand with a carving tool. The base was cast in one piece and sawed in two. Each base

is held in place by means of two 2-in. No. 12 screws. They fit in the holes left when the turned part was removed from the faceplate. The dominant color in these book ends is brown. Small amounts of red, green, and black were also used.

MODERNISTIC WASTEPAPER BASKET

John McGrath, High School, Batavia, New York

The wastepaper basket described herewith makes an interesting triangulation problem for the student. It is really a transition piece changing from a square to an octagon.



The project may be used as a problem in sheet-metal drafting or in the sheet-metal shop itself. If it is to be used only in the shop, the instructor may permit his students to use a master pattern as a template.

Tools Used: Tinners' mallet, wire nippers, scriber or scratch awl, straight snips, bar folder, hammer, rivet set, hand groover, wiring machine, stakes.

Material Used: 28-gauge IC tin or galvanized iron, No. 13 wire, 1 lb. rivets.

To construct the basket, the following steps should be followed:

1. Transfer the pattern to the metal (the student should use his own paper layout or the template provided by the instructor).
2. Cut out pieces with straight snips.
3. Hem bottom edges on bar folder.
4. Form seams on bar folder.
5. Turn over top edge for wire.
6. Break sides on beak horn stake with mallet.
7. Hook seams together and groove by hand.
8. Wire edge on wiring machine.
9. Break bottom flaps.
10. Punch holes and rivet bottom in place.
11. Clean entire basket with vinegar to remove grease and dirt. Wash with water and let dry.
12. Enamel in suitable colors.

TAPERING SAW JIGS

Donald A. Price,
Chicago Heights, Illinois

Figures 2, 3, and 3A show a simple jig which may be used on power saws for sawing tapers. Such jigs are used, for example, for producing the tapered table leg shown in Figure 1. These jigs may be made of ¾-in. straight-grained wood finished so that they have the same angle of taper as the saw cut desired.

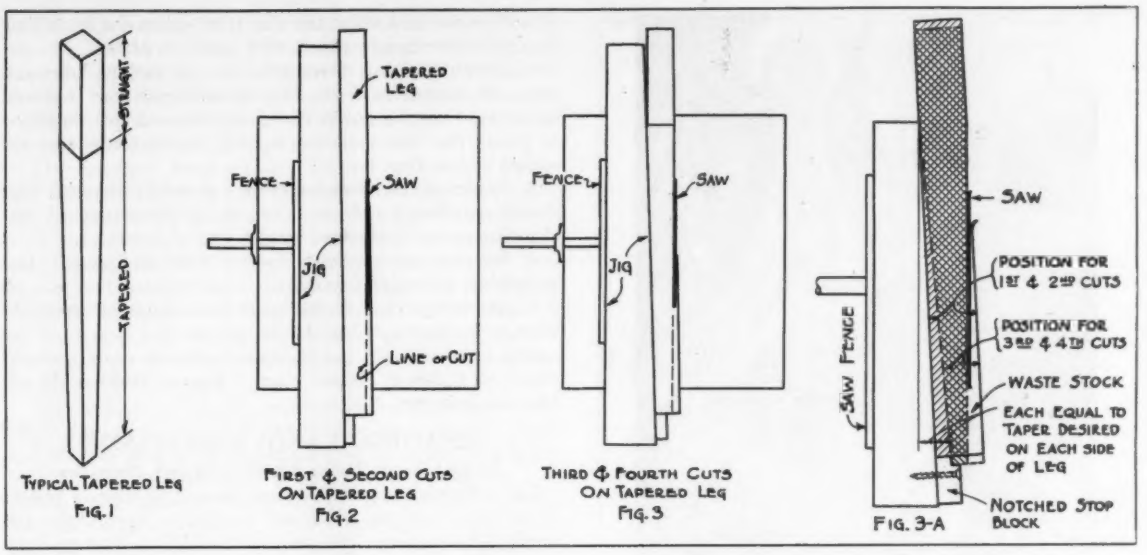
A small block may be glued or screwed to the following end to carry the work through the cut as the jig is fed along the regular rip fence of the power saw.

The jig shown in Figure 2 is used for making the first and second cuts; that is, to cut the taper on two adjacent sides of each leg. For the third and fourth cuts it is necessary to have a jig such as is shown in Figure 3 with double the taper.

The extra jig shown in Figure 3 may be omitted if a stop block such as is shown in Figure 3A is made. In using this latter type of jig, lay the work directly against the body of the jig for the first two cuts, and then into the notch as shown by the dotted lines for the last two cuts.

The sawing jigs described in the foregoing are especially useful for repetition work where the large number of pieces to be made justifies the trouble of making up special jigs. These jigs also have the advantage of preserving the exact taper so that accurate duplicates of the original pieces may be made at any time. Occasions arise, however, when only a few taper cuts are to be made, and then an adjustable taper sawing jig will be found especially useful.

Figure 4 shows such an adjustable jig which can be used for cutting almost any taper that may come up. It is set by the cut-and-try method. Figure 4 shows that this jig consists of two parts, one of which slides against the saw fence and the other carries the work through the cut by the stop block fastened near one end. The two parts pivot on a 1-in. No. 8 wood screw. The adjustment is made by clamping the two parts together with two ¼-in. stove bolts and nuts. When this jig has to be opened for wide tapers, the end clamp goes out of action, but the center bolt alone will hold the parts securely.



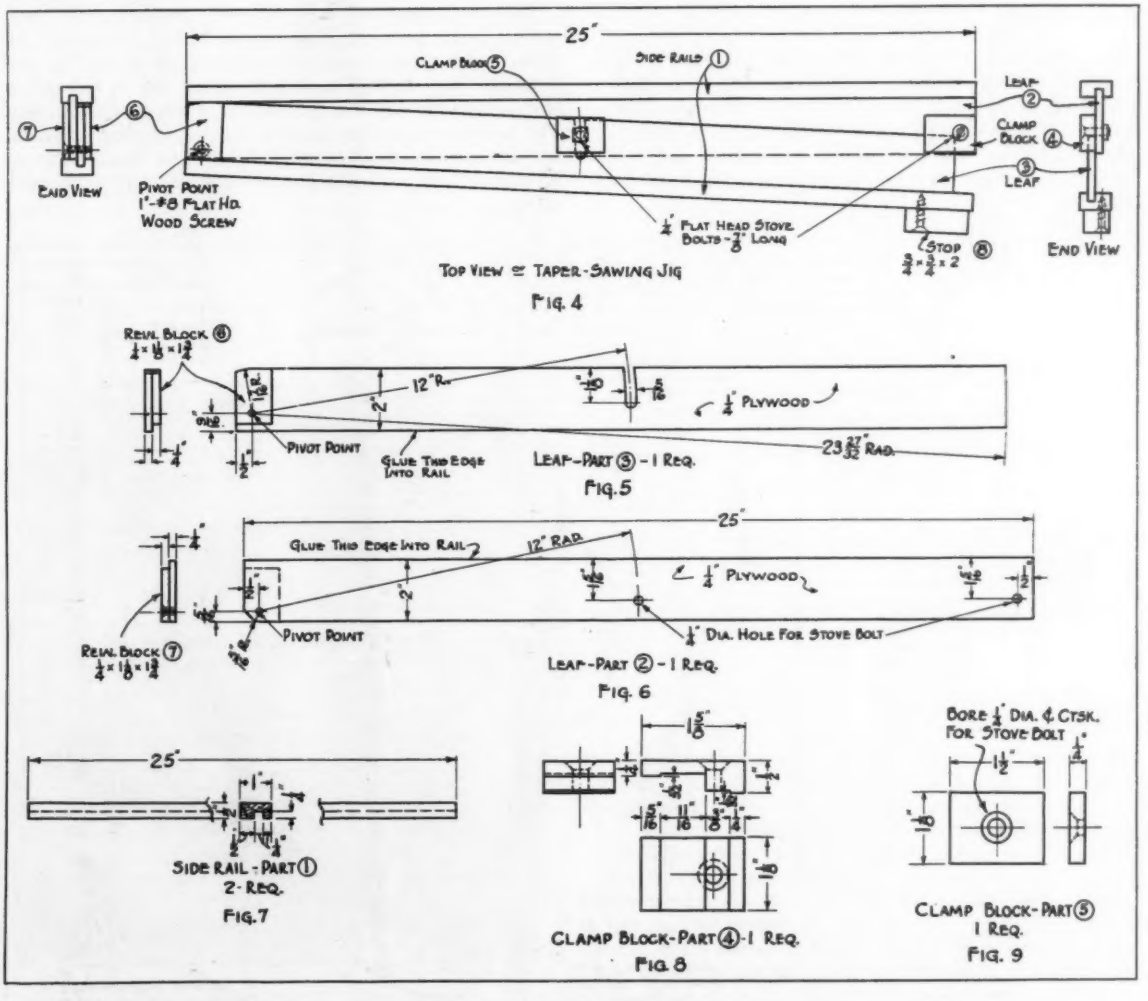
TYPICAL TAPERED LEG
FIG. 1

FIRST & SECOND CUTS ON TAPERED LEG
FIG. 2

THIRD & FOURTH CUTS ON TAPERED LEG
FIG. 3

FIG. 3-A

Details of simple tapering jig



TOP VIEW OF TAPER-SAWING JIG
FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

FIG. 9

Details of adjustable tapering jig

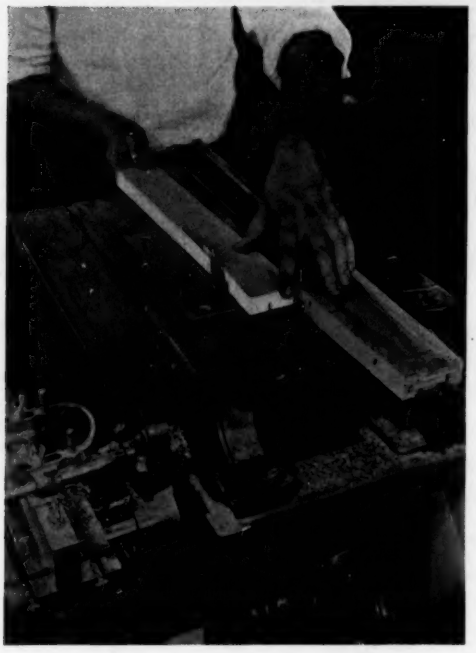


Fig. 10. The adjustable tapering jig in use

The illustrations show quite plainly how the parts are constructed, but the following few directions may be helpful:

1. Make the two side rails, Part 1 shown in Figure 7, cutting the slot a tight gluing fit for the leaves, Parts 2 and 3.

2. Next cut out the leaves, shown in Figures 5 and 6. Cut the slot shown in Part 3 but do not bore any of the holes shown till later.

3. Glue the leaves into the side rails and at the same time glue the reinforcing blocks, Parts 6 and 7, in place.

4. After the glue is thoroughly dry, lay out the holes and bore and countersink them. The center hole in Part 2 should be located from the slot in Part 3, and the end hole should be so placed that the end clamping bolt moves freely past the curved end of Part 3.

5. Next make the clamping block 4 shown in Figure 8. This should be relieved 1/32 as shown in the illustration so that clamping action is obtained at each end of the block.

6. The next step is to make block 5 shown in Figure 9. This is merely a rectangular washer.

7. One corner of each leaf must be rounded off using the pivot as a center to allow the jig to open.

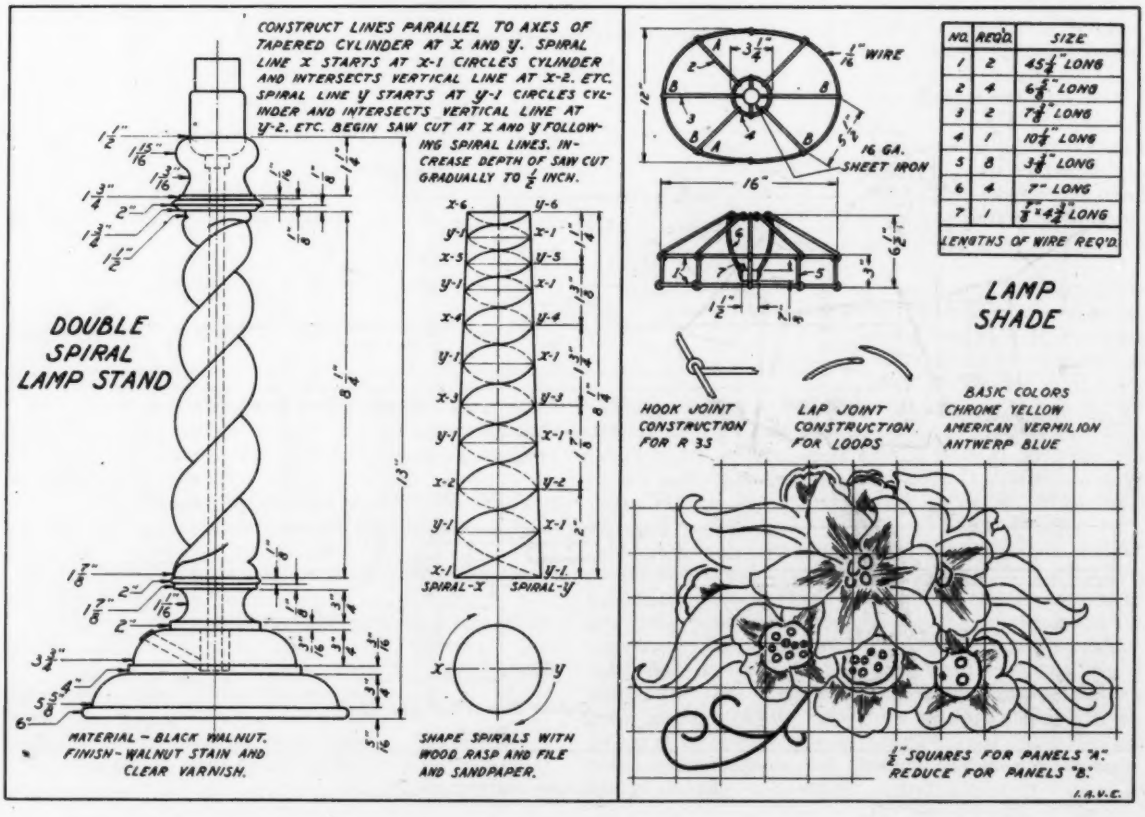
The adjustable jig just described operates exactly as the simple jig shown in Figures 2 and 3. Figure 10 shows the adjustable jig in use.

READING LAMP AND SHADE

Lemuel Harris, Public Schools, Hastings, Nebraska

The industrial-arts teacher must have at all times a variety of projects available, which are suitable to the abilities and needs of his students. The projects should first of all be interesting, then they should not be too difficult for the student, nor should they be so simple that they offer no challenge to the individual's ability. In order to possess these qualifications, the projects must be flexible in construction to meet the ability and the needs of the students.

The lamp described herewith was designed with these various needs in mind. The construction of the project involves wood turning, wood carving, boring, wood finishing, and some electrical work. The various details can be changed at will so that the work can be adapted to the students' ability. The making of the shade involves cutting, bending, soldering, sewing, drawing, and oil painting. All of these details also may be altered to suit individual tastes, requirements, and capabilities.


CONSTRUCT LINES PARALLEL TO AXES OF TAPERED CYLINDER AT X AND y. SPIRAL LINE X STARTS AT X-1 CIRCLES CYLINDER AND INTERSECTS VERTICAL LINE AT X-2. ETC. SPIRAL LINE y STARTS AT y-1 CIRCLES CYLINDER AND INTERSECTS VERTICAL LINE AT y-2. ETC. BEGIN SAW CUT AT X AND y FOLLOWING SPIRAL LINES. INCREASE DEPTH OF SAW CUT GRADUALLY TO 1/2 INCH.
DOUBLE SPIRAL LAMP STAND
SPIRAL-X
SPIRAL-y
SHAPE SPIRALS WITH WOOD RASP AND FILE AND SANDPAPER.
MATERIAL - BLACK WALNUT.
FINISH - WALNUT STAIN AND CLEAR VARNISH.
1" WIRE
16 GA. SHEET IRON
LAMP SHADE
HOOK JOINT CONSTRUCTION FOR R 33
LAP JOINT CONSTRUCTION FOR LOOPS
BASIC COLORS
CHROME YELLOW
AMERICAN VERMILION
ANTWERP BLUE
1/2" SQUARES FOR PANELS "A". REDUCE FOR PANELS "B".
I.A.V.C.
NO. REQ'D SIZE
1 2 45 1/4" LONG
2 4 6 3/8" LONG
3 2 7 3/8" LONG
4 1 10 3/8" LONG
5 8 3/8" LONG
6 4 7" LONG
7 1 3/8" x 4 3/4" LONG
LENGTHS OF WIRE REQ'D

The lamp stand is made of walnut. The hole is bored before the standard is turned. The electric lamp cord is passed through the hole in the base and through the hole in the standard and the wires connected to a standard lamp socket which is then mounted on a short length of ¼-in. pipe, tightly wedged into the hole in the standard.

The standard, when finished, should be carefully sanded and filled with a paste filler colored with walnut stain. After the filler has dried, the standard should be sanded lightly with very fine sandpaper after which 3 or 4 coats of clear varnish may be applied. Each coat should be allowed to dry thoroughly and sanded lightly before the next coat is applied. After the final coat of varnish is dry and hard, it should be sanded lightly and rubbed with pumice stone and oil, the final rubbing to be done with rottenstone. If desirable, a lacquer finish may also be used.

The lamp-shade frame is constructed by bending iron telephone wire to the forms shown in the illustration. The joints and ribs are secured by applying a drop of solder to each one. The support for the frame is constructed by shaping a tin ferrule to fit over the lamp socket, after which the joints may be soldered together. The wire supports are to be flattened slightly at the ends. One end of each wire is then soldered to the ferrule and the other to the frame. These support stays must be so shaped that there is sufficient space left to screw the lamp bulb into the socket.

The entire framework must then be wrapped with bias tape stitched in place to prevent slipping. Then a strip of white voile is stretched over the frame and fastened by folding the edges of the cloth around the loop at the top and at the bottom of the frame, where it is sewed to the tape on the underside of the frame. The joint in the cloth should be arranged so that it is directly over a rib. The top of the frame is left uncovered to facilitate the installation of lamp globes.

The next step is to apply about 10 successive coats of clear shellac to the entire surface of the shade, allowing ample time for each coat to dry. When finished, the cloth will be of a light-amber color. The frame supports may then be painted with aluminum, bronze, or gold paint.

The design for the decoration must next be selected. A free-hand drawing is best, but any available design may be used.

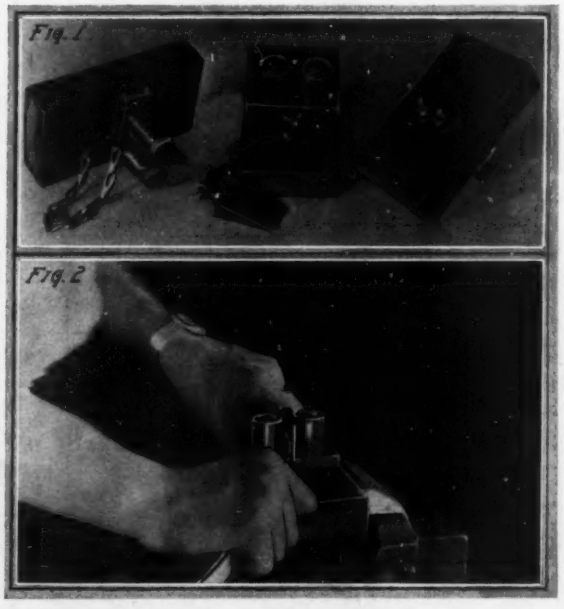


Fig. 1. A group of bending forks
Fig. 2. The bending fork in use

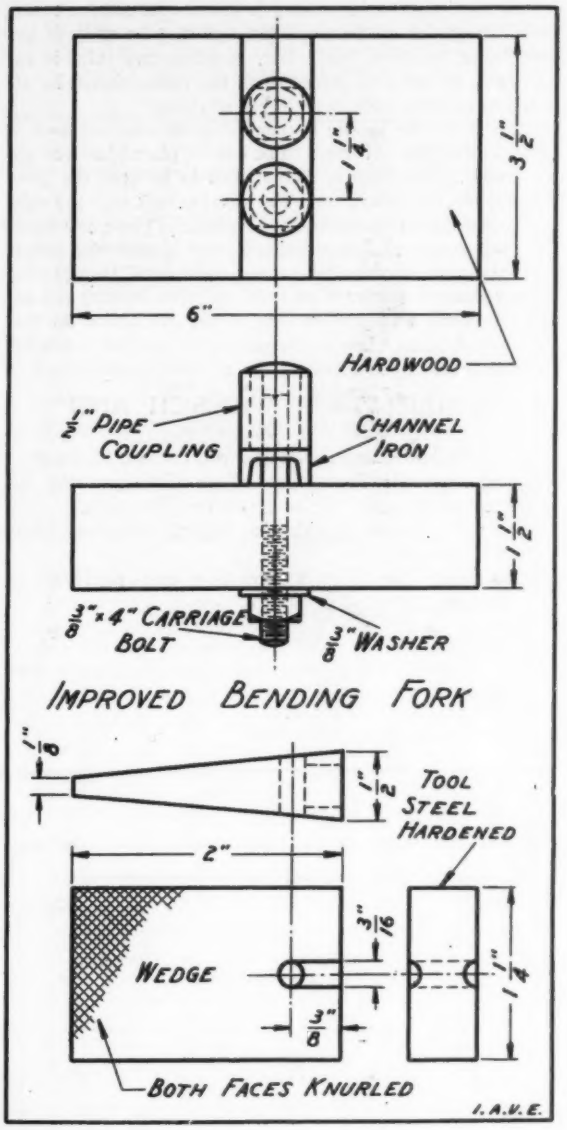


Fig. 3. Details of bending fork

The pattern chosen may be held against the underside of the shade and the outline traced through. After this has been done, the design is painted on with oil colors.

After the colors have dried thoroughly, gold braid may be sewed over the ribs and over the top and bottom loops of the shade.

AN IMPROVED BENDING FORK

R. W. Wagner, St. Paul, Minnesota

Boys are eager to make projects of bent iron. But the problem of bending the iron cold is a serious one and without some special device, the bending will not be successfully done. Boys usually cannot get results with the conventional bending fork. The writer therefore designed the device herewith described. With it, the average boy can bend band iron successfully.

The special feature of this improved bending fork is the wedge which holds the band iron securely in any position regardless of the curvature at the point where it is being held.

Figure 1 gives an idea of the general appearance of the bender. Half-inch pipe couplings are very satisfactory for

prongs, but if the teacher wishes to provide for smaller radius bends, lengths of smaller-sized gas pipe may be used. It has been found, however, that ½-in. couplings are suitable for most jobs. In order to prevent loss, the wedge should be attached to its block by a short length of chain.

When in use the bender is clamped in the vise as shown in Figure 2. The piece of metal to be bent is placed between the two prongs. The wedge is then slipped in between the piece of metal and the other prong. The metal is bent with the right hand while the left hand holds the wedge in place or loosens it as may be needed. The metal is worked between the prongs by an alternate process of giving it a slight bend, then moving it along about a quarter of an inch, and then bending it a little more. Boys readily learn how to use this device, so that very little demonstration on the part of the teacher is needed.

Figure 3 shows the details of the improved bending fork.

COMBINATION WRENCH AND SCREW DRIVER

G. H. Snaddon, Central High School, Detroit, Michigan

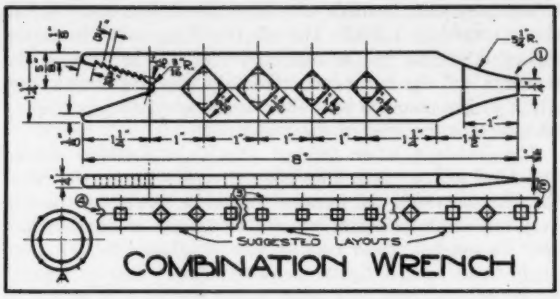
Processes Involved: Laying out; filing; drilling; sawing; fitting to gauge; use of jig; casehardening; polishing.

Problem: To make a combination wrench and screw driver from a blue print.

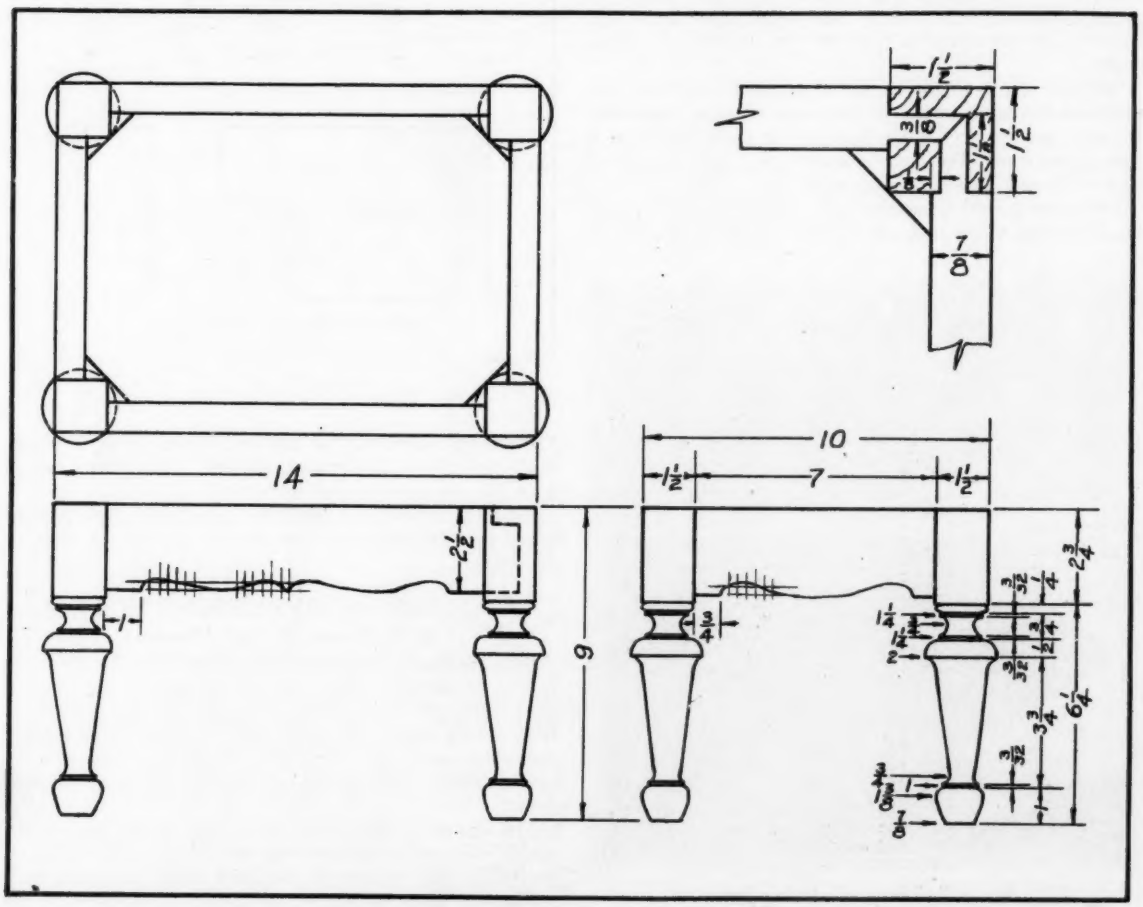
Specifications: Use ¼ by 1¼ by 8-in. cold-rolled steel or machine steel.

Procedure:

1. Mark length on stock, using a square and a scratch awl.
2. Saw to the line. If a power saw is used, set the stock down flat in the vise.
3. Rough square ends and sides.
4. Lay out and draw center line.

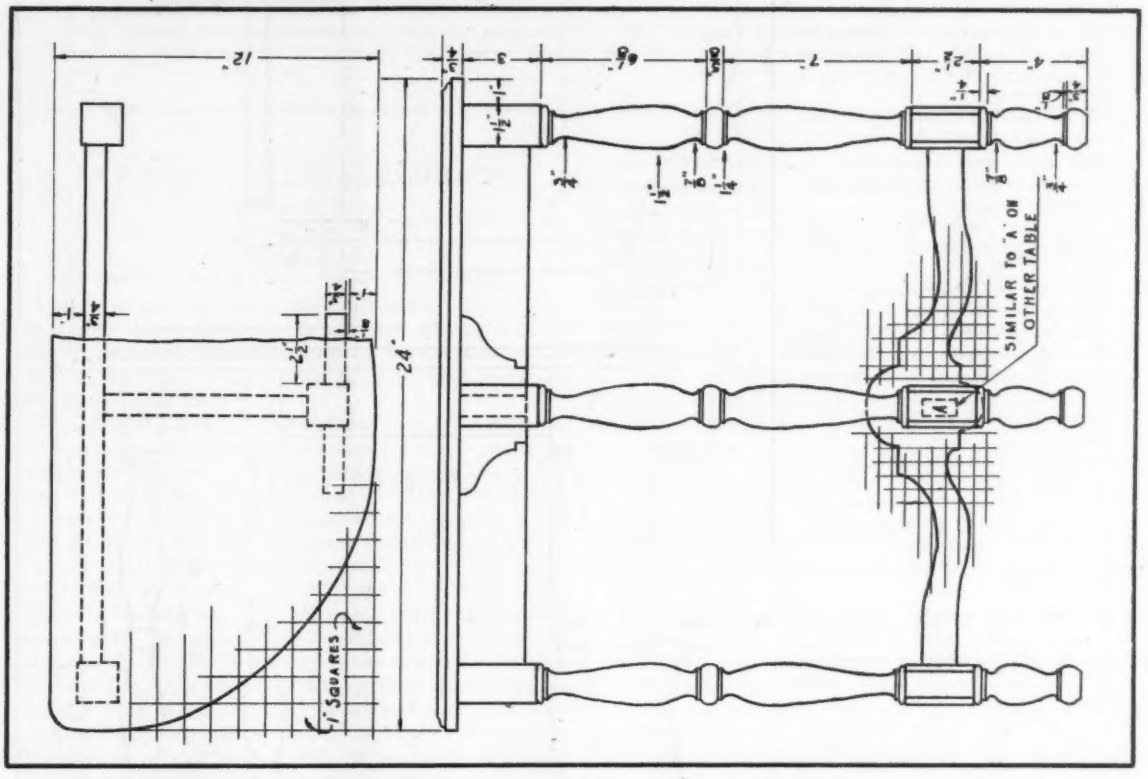


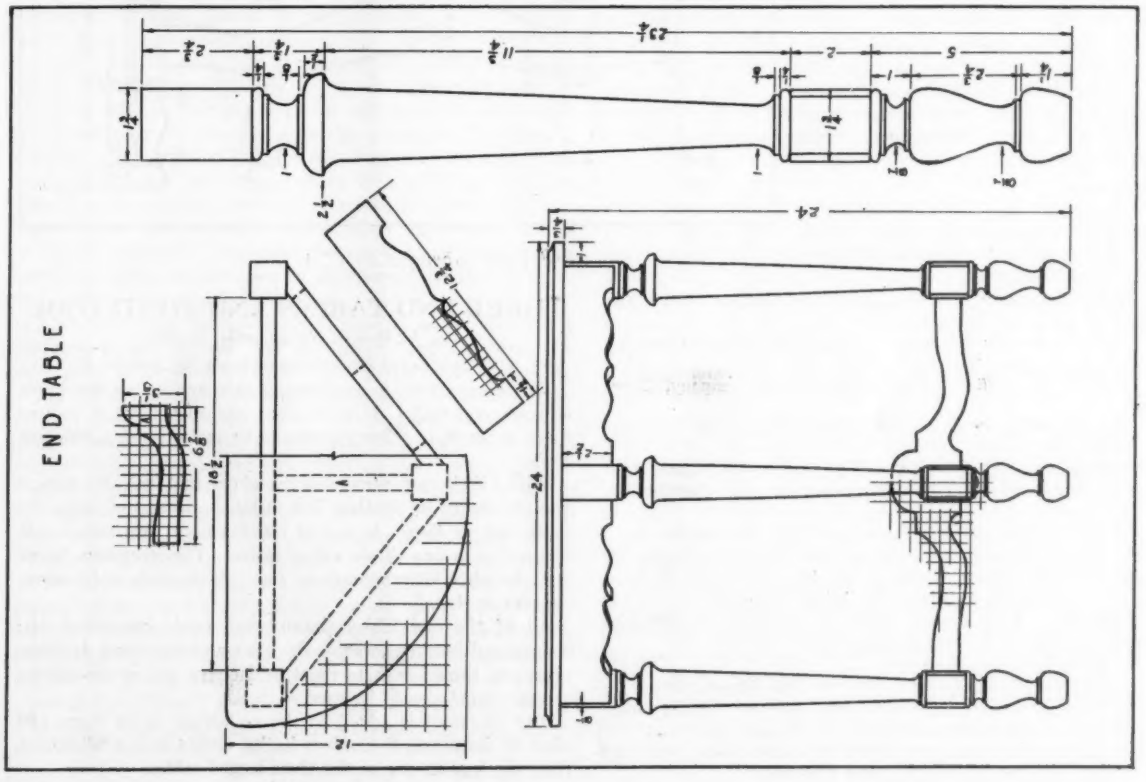
5. Lay out, scribe, and center-punch locations for holes as shown at A. Make a heavy punch mark in the center, and light punch marks around the circles. (If a jig is used for drilling, laying out is not necessary.)
6. Drill the holes in the drill press.
   a) Clamp the stock in the vise with a block of wood under it.
   Note: Be sure the vise is clamped to the drill-press table.
   b) Secure the tools needed: Taper-shank and straight-shank drills; taper sleeves; drill chuck; chuck wrench; drill drift.
   c) Fit the drill to a sleeve, then fit the sleeve in the drill-press spindle. To tighten the sleeve or drill in the drill-press spindle, place a block of wood across the vise, or on the table, then bring the drill down lightly on it. (If a drill chuck is used, fit a sleeve on it, fit it into the spindle, then tighten the drill in the chuck.)
   Note: The drill-press spindle, the outside and inside of sleeves, drill shanks, etc., must be kept clean.



Footstool submitted by C. A. Rosell. *See article page 264*

d) Adjust the table for height, and so that the center-punch mark on the hole to be drilled comes directly under the drill.
e) Lock the table and the table arm in position.
f) Adjust the machine for medium speed and medium feed.
g) Use a drill drift to remove the sleeve from the drill-press spindle or from the drill. Never allow the drill to drop on the drill-press table or on the work. Why?





End Tables submitted by C. A. Rosell. *See article page 264*

h) Use lard oil or soda water for cutting compound.
Note: When drill is completed clean the drill press thoroughly and return all tools to their proper places.

7. Lay out squares. Use the combination square and scratch awl. Suggestions for layouts are shown at 1, 2, 3, or 4 in the drawing.
8. File to the lines with a square file. Test each hole with the gauge. The gauge should pass through.
9. Mark out alligator wrench and screw-driver ends.
10. Saw inside of the line on wrench end, outside of the line on the screw-driver end.
11. File to the line on both ends.
12. Taper screw-driver ends as shown.
13. File teeth on wrench end. Use a three-cornered or three-square file. Space the teeth evenly and file to uniform depth.
14. Draw file smooth all over.
15. File corners and edges round.
16. Stamp your initials on neatly near the screw-driver end.
17. Caseharden. (Consult instruction sheet on heat treatment of metals.)
18. Polish with emery cloth.

Appraisal: What value do you place on the finished wrench?

1. Are the holes centrally located and evenly spaced?
2. Do they fit the standard gauges?
3. Is the screw-driver end correctly filed and shaped?
4. Are the teeth on the wrench end evenly spaced, and correctly shaped?
5. Are all corners and edges well rounded?
Show your wrench to the instructor and get his opinion of it.

Tools Used: Bastard file, mill file, three-square file, square file, hack saw, dividers, scratch awl, combination square, center punch, taper-shank drill, straight-shank drill, drill drift, drill chuck, chuck wrench, drill jig.

References:

Burghardt's *Machine Tool Operation,* Vol. I, Chaps. XII–XIV incl.; Vol. II, Chaps. I–III incl. McGraw-Hill Book Co., New York, N. Y.

Pratt's *Elementary Machine Shop Practice,* Chap. I. D. Van Nostrand Co., New York, N. Y.

Kaup's *Machine Shop Practice,* Chaps. I–III incl. and Chap. VI. John Wiley & Sons, New York, N. Y.

Handbook for Drillers. Cleveland Twist Drill Company, Cleveland, Ohio.

Modern Drilling Practice. The Industrial Press, 140 Lafayette St., New York, N. Y.

Hack Saws and Their Use. The L. S. Starrett Co., Athol, Mass.

Hack Saws and Their Use. Clemson Bros., Inc., Middletown, N. Y.

The File in History. Henry Disston and Sons, Philadelphia, Pa.

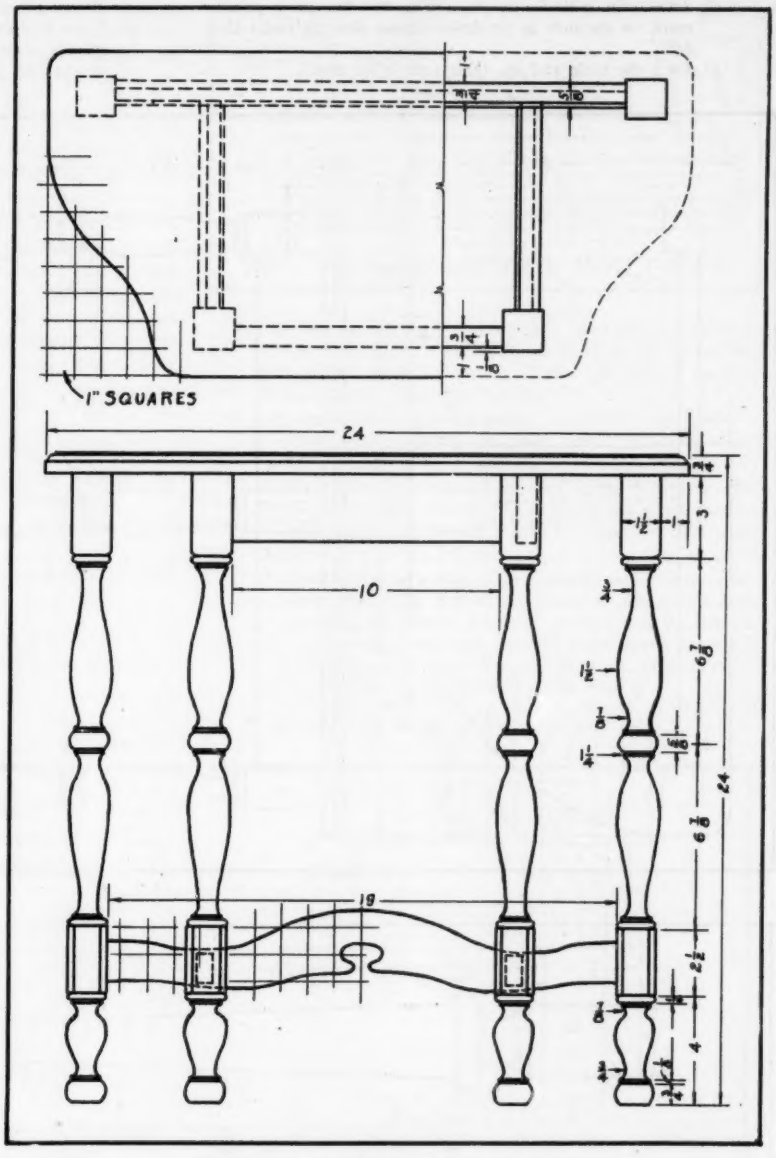
Disston File Charts. Henry Disston and Sons, Philadelphia, Pa.

Nicholson File Charts. Nicholson File Co., Providence, R. I.

Related Problems for Minor Research

Write two or three hundred words on any one of the following topics. Consult the references given above.

1. Hack Saws and Their Use.
2. (*a*) Forms and Uses of Files. (*b*) File Manufacture.
3. (*a*) Drill Press Construction. (*b*) Parts of a Twist Drill.
(*c*) Drilling Speeds and Feeds.
(*d*) The Operation of a Drill Press.
(*e*) The Use of Drill Jigs and Fixtures.



End Table submitted by C. A. Rosell

THREE END TABLES AND FOOTSTOOL

C. A. Rosell, Indianapolis, Indiana

(See additional illustrations on pages 262 and 263.)

The illustrations accompanying this article present three different end tables. If more than one such table is wanted for a room it is quite customary to make it of a different design.

With a little care, some features of one table may be worked into the design of another. For instance, instead of using the three rails as shown in one of the drawings, two rails might be used as in one of the other designs. The stretchers below may be also interchanged in some cases with only minor changes in design.

All of the end tables shown were made of walnut and stained and finished to show the beauty of the wood. If, however, one should wish to paint or lacquer any of the pieces, cheaper wood should be used.

The footstool is added to the collection as an extra odd piece of furniture. It receives its leg design as a modification from the legs on one of the three-legged tables.

THE CHALLENGE ANSWERED

Mr. Frank Bruce's letter to the presidents of the American Vocational Association, Western Arts Association, Eastern Arts Association, and local and state associations, which appeared in the June, 1933, issue of Industrial Arts and Vocational Education, aroused widespread interest.

Mr. Pelikan's answer to this letter appeared in the last issue. Two more answers follow:

OUR REPLY TO FRANK BRUCE[1]

By William E. Warner
Ohio State University,
Columbus, Ohio
President, Western Arts Association, 1932–33

Many will have seen and read the interesting editorial written by Mr. Frank Bruce to the presidents of our national, regional, and state associations, which appeared inside the cover of the June, 1933, number of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

The editorial was written, presumably to assign the responsibility for leadership during the emergency in our profession to the presidents of the various associations indicated. The present remarks are concerned with discussing Mr. Bruce's assumption and with giving a professional appraisal of the work of the *Western Arts Association* during the past year.

It is a postulate that publishers, along with sales managers, city supervisors, directors, and principals, in addition to the rank and file of teachers, including college professors, suddenly become aware that something outstanding ought to be done, in fact must be done, by "somebody" when it is discovered that the old ship is floundering. Mr. Bruce implies that the responsibility may be assigned to the presidents of our associations, yet we are well aware, from reputable researches on the topic, that teachers, after years of service in the field, only change two per cent from the way they were originally taught. This would seem to lay the responsibility for progress in our profession at the doors of our institutes, colleges, and universities where shop teachers are prepared.

It would seem, then, that Mr. Bruce does have a point, but when one scrutinizes the history of an association like the *Western Arts Association*, organized way back in 1893, one is impressed with the idea that even the association president is frequently somewhat of a doubtful person upon whom to place responsibility in a time of emergency. Perhaps it is not a question of an association president or a college teacher or a city supervisor or a publisher or a classroom teacher who should be made responsible, but rather the *method* any one of these persons employs when he has an opportunity for leadership of the type we have enjoyed this year.

There are many questions which began to assert themselves in the beginning of our year and which suggested ideas for leadership of the kind for which Mr. Bruce seems to be asking. First of all, what are associations for? Is it enough to sponsor just a convention, and addresses, and exhibits, and printed proceedings, and general fellowship, and a growing professional consciousness and resulting development, in an annual routine? Should there be any relationship between speeches on any one program or between programs? Should some particular phase of the field represented be exploited? Should the program be technical in a time of economic stress, or more professional? Should administrators, school boards, parent-teacher associations, women's clubs, state associations, honorary professional fraternities, and the like, be drawn into the picture? Should more money or less money be spent on a program in a year like this? Should manufacturers of educational equipment and supplies be drawn into the picture any more or less fully than before? Should the leaders of the profession be generally included in the convention plan or should only a few be presented, as is frequently the case? Should any great amount of attention be given to propagandizing the program, or should publicity be held back until a few days before the convention? Should unusual care be used in what is said by and about an association in a crucial year? Should a theme chosen for the convention concern itself with something not yet established, or with something basic which, if established, will pretty well define the place of our subjects in the American school picture? Should *just anyone* be invited to speak on any subject for any length of time, or should a program first be planned around certain themes essential to the welfare of our profession in a time of stress? Would it seem wise to stress philosophy alone, or better, to emphasize the application of a philosophy in such things as organization, research, and individual appraisal? Should an association meeting in a certain territory be concerned with the particular region in question? Should an association think only of itself, or should it think of what it can do for the promotion of the subjects it represents, with the force of its organization? Should the basis for economy back of decisions regarding major policies be influenced solely by a monetary criterion or always first by an intrinsic, or professional criterion? Or, as the old saying expresses it, should we be "penny wise and pound foolish"?

These and many other questions arose in our initial study of the *Western Arts Association*. Our first move was to take a 7,000-mile trip across the United States for the purpose of seeking counsel with older heads in connection with the development of a notable program. Our plan worked out something like this: An exhaustive study of *professional needs* was made during May, June, and July; a *topical plan* of programs was developed in August; an extensive *search for outstanding names* to carry out the plan was made in September, October, and November; culminating in a printed announcement of the complete program early in December. The following months were then spent in promoting the program in all sections of the United States. Some 19,500 copies of the completed program were distributed in this connection between December 1 and May 1. All of this consumed money and time, but that is what such things are for, and particularly so in a time of emergency or need. Mr. Bruce is quite right in his challenge. But what of the Columbus convention?

Considerable care was given in preparation for the meeting, to a program of five publications in as many months. The first concerned itself with an Announcement and described a great educational city. The second number revealed the Organization back of a great program and showed a roster of speakers selected from coast to coast to make the forthcoming convention a success. The third issue concerned itself with the report of a Research Investigation, which was an index of one of the finer things an association could do when the leadership in that association sponsored studies or similar contributions to the professional advancement of the subjects represented. The fourth publication included the pictures and Biographies of many of the speakers slated for the convention; and the fifth concerned the Program itself, with a list of *one hundred speakers*.

An analysis of the program revealed promotional sections, several professional sections, research and appraisal sections, a program built around the administrator's viewpoint, a social

[1] An address made at the Stout Institute, Menomonie, Wis., during the installation of Theta Chapter of Epsilon Pi Tau on May 27, 1933.

program, a fraternal program, and an alumni program, as well as a Fortieth Anniversary Party. Each program was built around a central topic and was developed as a symposium, with an opening, or orientation speaker to develop the topic, followed by an application or two, and a critical summary. The appraisal program was conducted as a panel section. Since people in our profession have difficulty in respecting time on a program, each presentation was timed in the schedule to make speakers as well as audiences conscious of time. And so the story goes.

Did the year's work and the convention accomplish what Mr. Bruce intimates was needed? The answer is seen in responses from every hand. Persons occupying positions of leadership attended the convention in greater measure than has been seen in many years. It was obviously impossible for the rank and file of teachers to attend in any great number this time, but leaders were present from all sections of the United States. The commercial exhibitors were particularly pleased at the contacts, and the leaders were pleased at an opportunity to match notes on conditions and progress in various sections of the United States. The rank and file of teachers who could attend report general satisfaction with the things learned and with challenges made which broadened their viewpoints. The participation of a number of prominent administrators, among them the new United States Commissioner of Education, and representatives of national, state, municipal, and college administrations, all gave the three subjects of Art, Home Economics, and Industrial Arts a greatly improved professional setting. Five thousand mounts of educational exhibits, gathered from many sections of the United States, provided an obvious index of progress for everyone to see.

The coöperation of members from other organizations was evident. These included Better Homes in America, Rotary International, Ohio Educational Association, Ohio Congress of Parents and Teachers, Ohio State Federation of Women's Clubs, Eastern Arts Association, Southeastern Art Association, Pacific Arts Association, American Vocational Association, American Association of University Women, National Education Association, and the American Federation of Arts, along with six national honorary professional arts fraternities. All responded in contributing to the establishment of a theme which concerned itself with indicating *The Primacy of the Arts*.

The establishment of *primacy* for such subjects as Industrial Arts would seem to label the academic subjects as *secondary*. Can this possibly be so? Surely nothing which any shop teacher admits as a fad or frill could be considered as any better than tertiary. Consequently, nothing was included in the program which was at all questionable, but rather was concern shown for applying a basic social-economic philosophy. As one looks about himself in 1933, he finds four great social-economic units of life which may well be considered primary in the establishment of any progressive American school curriculum. These include the Home, Agriculture, Industry, and Commerce. The *Western Arts Association* does not concern itself with agricultural or commercial representations. It is rather built around things which have a common *esthetic* bond, and perhaps too fully around purely *fine* arts. *Primacy comes with the establishment of social and economic usefulness for the various arts subjects represented.* Woodwork alone can never be considered of social and economic worth to the same degree as work in *many* industrial media. Homemaking, confined to the old *cooking* and *sewing* of the nineties can never claim primacy as can modern developments in *foods* and *clothing*. Purely abstract, technical or "fine" art is not to be compared, in the claim for primacy, with applied art in many media, particularly as regards everyday life and the home. This is a sample of the reasoning used in determining and developing our keynote.

The above is a partial report of twelve months of interesting work in planning and carrying through a program for the *Western Arts Association*. We trust that Mr. Bruce and other friendly critics will feel that the leadership back of this Association in 1932–33 did sense its responsibility and make the most of a truly great opportunity. Our interest is now directed toward the future. If every one of us will do more than his share next year, there will be no need another time for Mr. Bruce to address the *presidents!*

AN ANSWER TO MR. BRUCE'S STATEMENT

By Frank H. McCrea
Director Vocational Education,
Muskegon, Michigan
President, Michigan Industrial Education Society

The slogan of the *Michigan Industrial Education Society* for the year 1933–34 is "Harmony" and our association theme is "Education for Service; Not Special Education." The way that superintendents, high-school principals, college men and women, as well as all representatives of general or academic education, attended the annual convention of the *Michigan Industrial Education Society,* April 20, 21, and 22, at Muskegon, Michigan, and the hearty enthusiasm and spirit of coöperation with which they entered into program discussions is evidence of the fact that there is no fight on within the ranks of the teaching profession in the State of Michigan.

Wherever the attacking strength of the present economic depression has been sufficient to force a retreat, we have retreated on parallel lines. There has been no wholesale cuttings or eliminations. The profession presents a united front and solidarity of effort. The theme of the *Michigan Industrial Education Society,* "Education for Service" might well be adopted by any educational organization within the state.

The Executive Committee of the *Michigan Industrial Education Society,* in session at Lansing on May 20, selected Battle Creek, Michigan, for our 1934 convention city. The Convention Committee, under the Chairmanship of the vice-president, Harry Burnham, Director, Industrial Arts, Flint, Michigan, has announced the dates of April 19, 20, and 21, 1934, with the full approval of the Executive Committee.

The best address that the writer has ever heard on the indispensability of a thoroughly sufficient industrial-arts program was given by Mr. Colburn, superintendent of schools, Battle Creek, on May 13, on the occasion of the special committee's inspection of the facilities afforded by the cities inviting the 1934 Annual Convention of the *Michigan Industrial Education Society.* This reference to Mr. Colburn's talk before the committee is cited only because it is so typical of the way in which school administrators in the State of Michigan are "standing by" our program in these times of economic distress.

If there is any misgiving concerning the future in the State of Michigan, it is for the future of education, not industrial arts and vocational education.

If there is any service that the *Michigan Industrial Education Society* can properly render to our professional friends, wherever they may be located, we shall gladly assume that responsibility.

USING A FRISKET TO SAVE A HALFTONE

R. Randolph Karch, Arsenal Junior High School,
Pittsburgh, Pennsylvania

Very often the school paper or magazine can be made to look better by the printing of pictures either on the cover or inside. Many local business houses are quite willing to coöperate with the school printshop by furnishing cuts of various kinds. Some time ago, the writer was lent a cut which was at least two inches too wide for the paper which was to be used. Since it was not permissible to trim the cut to a smaller size, it was decided to use friskets attached to each of the two grippers. This permitted only a part of the picture to print, while the rest appeared on the strip of tympan paper which was pasted between the grippers to form the frisket.

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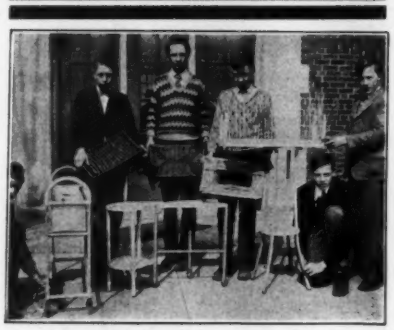

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Western States Envelope Co. 4a
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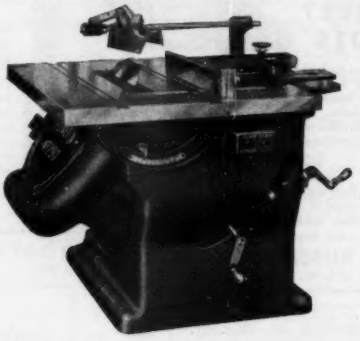
SchoolShopEquipmentNews

NEW OLIVER TILTING-SAW BENCH

The Oliver Machinery Co., Grand Rapids, Mich., has just announced its new No. 290 double-arbor, tilting-saw bench, which marks a striking advance in the design of circular-saw benches. It combines the operating and safety features of the Universal double-arbor saw bench and the tilting-arbor miter saw not previously available in one machine.

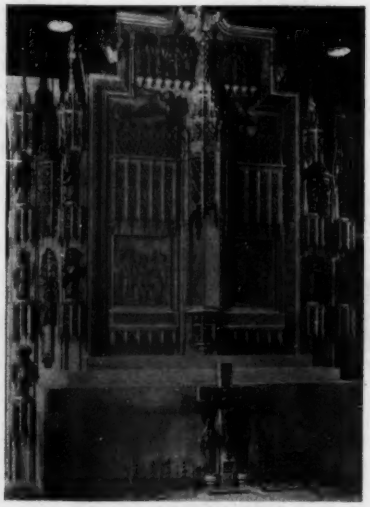


The machine has two shaftless motors, mounted on the saw arbors and held in an accurately machined tilting frame, permitting 45-deg. inclination; a table which always remains in the horizontal position; a saw guard which is effective in any position of the saw; and a combined electric and mechanical brake which stops the saw automatically when the current is shut off.

The ripping fence may be used on either side of the saw. It is of the nontilting type and is equipped with a micrometer adjustment for accurate setting.

NEW SMALL ROUTER FOR CARVING

The R. L. Carter Products Company, New Britain, Conn., has just issued its new small, electric, portable router for use in wood carving. The new machine is an advance in machines of this type, which until recently, were used only for plain routing. The carving shown in the illustration was done with a router of this kind.



Carving done with Carter router
Photo courtesy of The Lithurgical Arts Guild of Cleveland.

The firm manufactures a line of small hand machines, suitable for wood carving, in sizes varying from 1/7 to 3 h.p., and weighing from 3½ to 35 lb.

Straight-Line Block Letter Alphabet, Designed by Charles Quinlan, Jr., Bridgeport, Conn.

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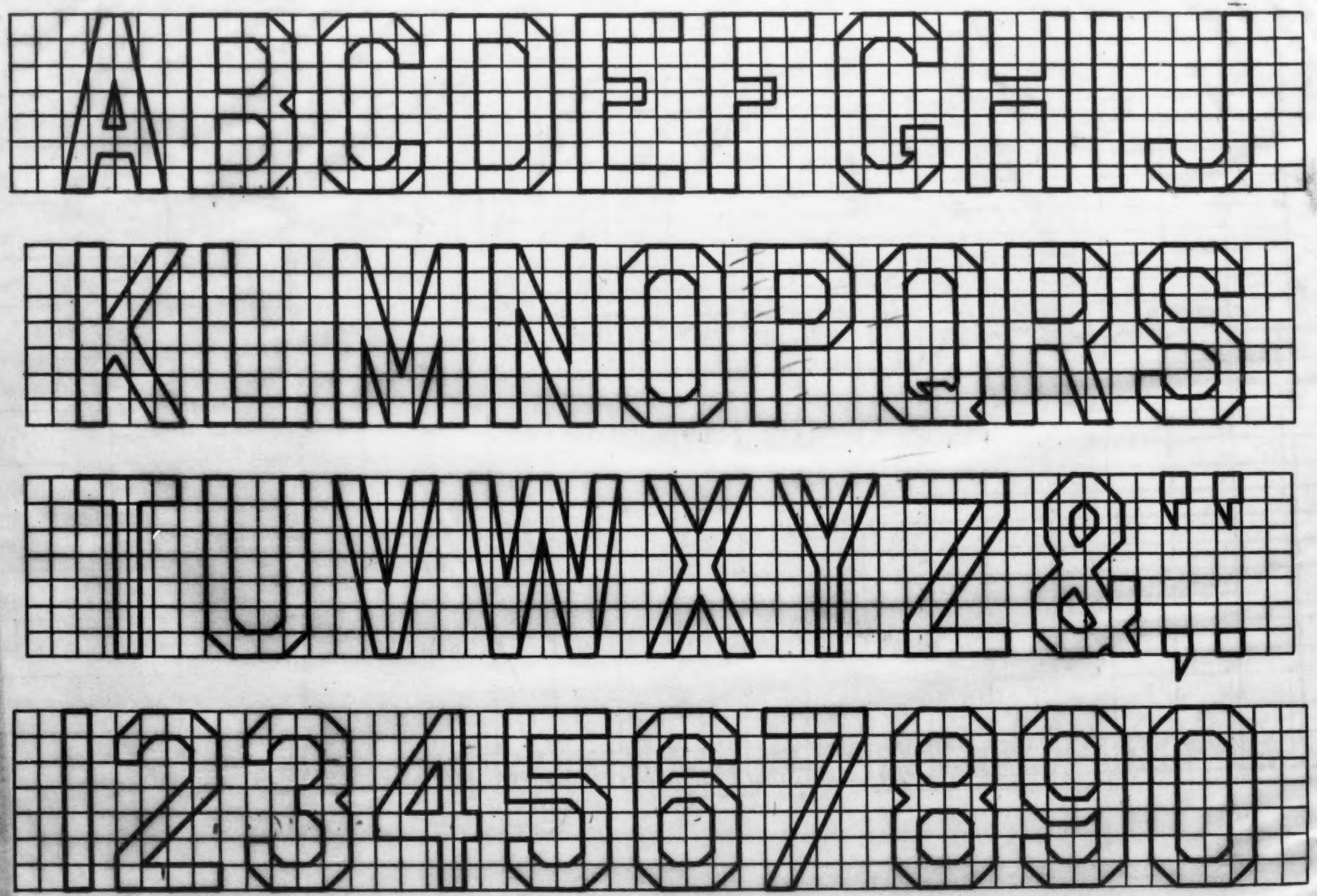

Straight-Line Block Letter Alphabet, Designed by Charles Quinlan, Jr., Bridgeport, Conn.

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION
TRACING SUPPLEMENT, No. 272, AUGUST, 1933

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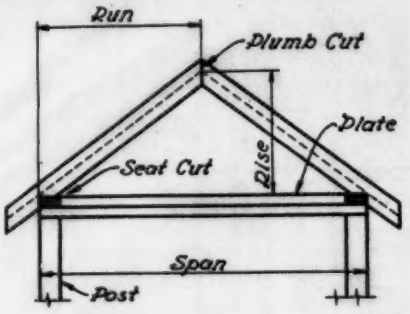
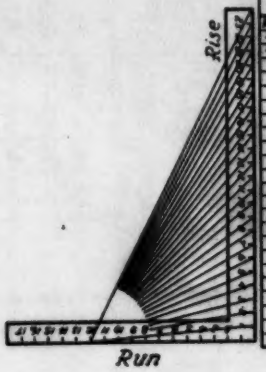
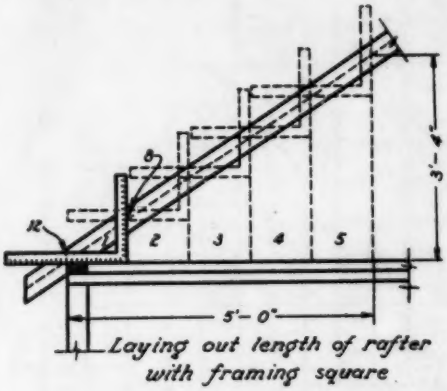
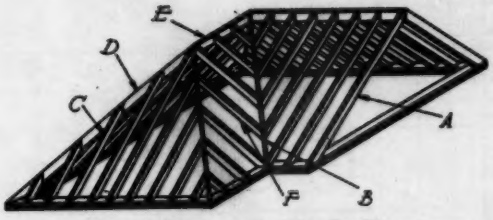




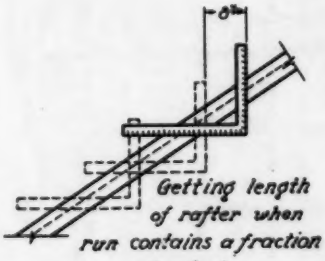
PITCH	DEGREES	LENGTH OF COMMON RAFTER PER 12" OF RUN	LENGTH OF HIP OR VALLEY RAFTER PER 12" OF RUN
SQUARE	63°-26'	24.70"	29.36"
13/24	62°-27'	25.94	28.55
11/24	61°-23'	25.06	27.76
5/12	60°-15'	24.19	26.98
1/2	59°-02'	23.31	26.21
19/48	57°-44'	22.50	25.45
3/8	56°-19'	21.62	24.72
17/48	54°-47'	20.78	24.00
4/12	53°-08'	20.00	23.31
5/16	51°-20'	19.19	22.64
7/24	49°-24'	18.43	21.99
13/48	47°-17'	17.68	21.37
1/4	45°-00'	17.00	20.78
11/48	42°-30'	16.25	20.22
3/12	39°-48'	15.62	19.69
3/16	36°-52'	15.00	19.21
1/6	33°-41'	14.43	18.76
7/48	30°-15'	13.85	18.36
1/8	26°-34'	13.43	18.00
5/48	22°-37'	13.00	17.69
1/12	18°-26'	12.62	17.43
1/16	14°-02'	12.37	17.23
1/24	9°-28'	12.19	17.09
1/48	4°-46'	12.06	17.00



Laying out length of rafter with framing square

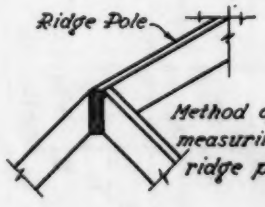


A. Common Rafter
B. Valley Rafter
C. Jack Rafter
D. Hip Rafter
E. Ridge Pole
F. Cripple Rafter

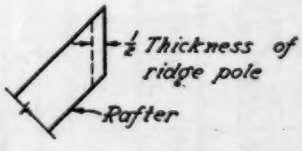


Getting length of rafter when run contains a fraction of a foot

Easy way to get bevel on hip



Method of measuring for ridge pole



FRAMING CHART-ONE

Table of regular cuts

Type of cut	On blade take	On tongue take	Cut on
Seat cut of common rafter	Run of common rafter	Rise of common rafter	Blade
Plumb cut of common rafter	Run of common rafter	Rise of common rafter	Tongue
Seat cut of hip or valley rafter	17	Rise of common rafter	Blade
Plumb cut of hip or valley rafter	17	Rise of common rafter	Tongue
Side cut of jack rafter	Length of common rafter	Run of common rafter	Blade
Side cut of hip or valley rafter	Length of hip rafter	Run of hip rafter	Blade
Backing off hip rafter	Length of hip rafter	Rise of hip rafter	Tongue
Face cut on roof boards	Length of common rafter	Run of common rafter	Tongue *
Miter cut on roof boards	Length of common rafter	Rise of common rafter	Tongue *

*Cuts and bevels for flaring square hoppers are made same as for hip and valley boards

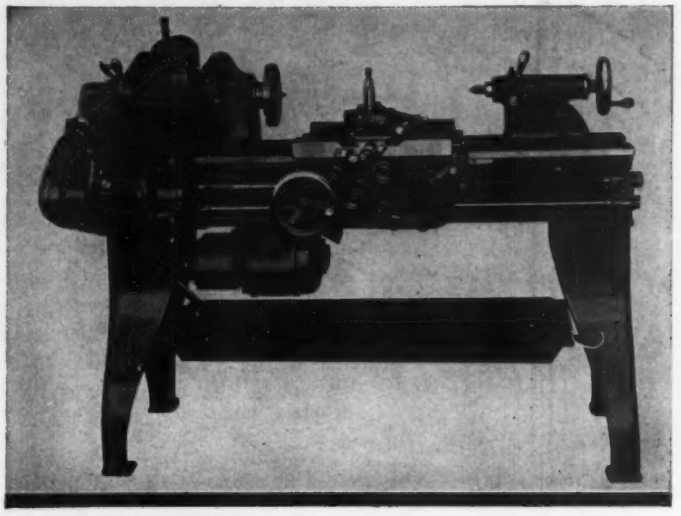
I.A.V.E.

Submitted by K. L. Jelson, Butte, Montana

BUDGET CUT?

Read This!

Budgets are slashed—but the younger generation continues to report for instruction. Suitable equipment for the purpose **must** be obtained and maintained. But how—on a reduced appropriation? Buy carefully, wisely. For the machine-shop, buy tools which represent the greatest **value;** practical tools, accepted and approved by extensive industrial use and priced within your budget. Such a tool is the Special Rockford Economy Lathe illustrated at right. It meets all of your requirements **and direct connected multi-speed motor-drive is included in its remarkably low price.** Installation in any location is easy, upkeep practically nothing. Write today for circular describing features and advantages.



The Rockford Hy-Service Shaper is equally practical for school use—an equally good investment. The Rockford Hy-Draulic Shaper-Planer provides facilities for giving instruction in the use of **both** hydraulic speeds and feeds. Ask, also, for circulars on these machines—write today.

ROCKFORD MACHINE TOOL CO.

LATHES . . . SHAPERS . . . SHAPER-PLANERS

ROCKFORD, ILLINOIS, U. S. A.

New!

Let's unravel this yarn about the Budget

Here is a solution

Take this new double-duty

TAKE-ABOUT *Sander for instance*

THE budget seems to be a bugaboo. Naturally instruction suffers when proper equipment is not available. PORTER-CABLE's new model T-3 TAKE-ABOUT Sander solves the problem.

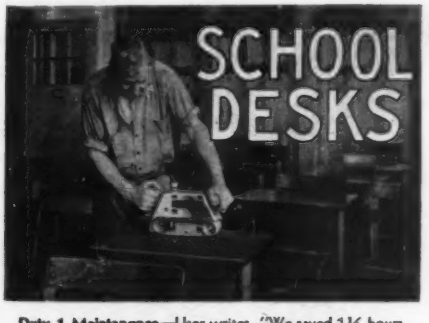
1—Put this Sander to work on maintenance, i.e., sanding blackboards, refinishing desks and tables, polishing metal, and many other finishing jobs. It will pay for itself in short order.

2—Then turn your new TAKE-ABOUT over to the shop. Watch the new interest the students take in their work. They will get a perfect finish because the TAKE-ABOUT is perfectly balanced.

Write for a demonstration or descriptive bulletin. No obligation. Letters from schools using PORTER-CABLE Equipment will bear out our promise of a double-duty tool.

PORTER-CABLE MACHINE CO.

1702 No. Salina St. Syracuse, N. Y.



Duty 1 Maintenance—User writes, "We saved 1¼ hours sanding each desk."

Duty 2 Shop Work—Students enjoy using TAKE-ABOUT

To the Art Teachers of America:

Courtesy of the Industrial Arts and
Vocational Education Magazine

The Eastern Arts Association gladly accepts the challenge of Mr. Frank Bruce to describe the means by which it is trying to meet the economic crisis affecting the schools of the nation.

The parents of America have wanted and will always want the kind of education which will best fit their children to become successful men and women. These parents can be brought to the understanding that a broad training in the Arts makes for social stability and economic security.

The Eastern Arts Association proposes to bring to the attention of the people of every city, town and hamlet within its jurisdiction the fact that the power and greatness of this country in world affairs has come to a large extent through the use of the Arts in developing its national resources. If our country is to continue to hold this place the youth of the Nation must be given the opportunity to participate in activities which are insolubly tied up with the everyday life of its people.

We believe that when the people of any community realize that limitation of educational opportunity along these lines may endanger the future of its youth, they will forever silence those advocates of a false economy which would bring this about.

Conscious of the necessity for prolonged publicity along these lines, The Eastern Arts Association suggests that any feasible plan by which the American Vocational Association, the Western Arts Association and the Eastern Arts Association can cooperate in broadcasting information will be welcomed by its membership.

It is true that many teachers of the Arts have not in the past been able to successfully demonstrate the value of the subjects they have been teaching.

At present The Eastern Arts Association has a plan under way by which each member of the Association will be guided in disseminating information which should strengthen the position of his work in the field of education.

We may not have a Roosevelt in the educational field but at least we can follow his example and present our case to the people, appealing for a "A New Deal in Education."

The Eastern Arts Association has adopted as a theme for the 1934 convention in Rochester, N. Y., "Arts—The Anchor of Social Stability." We are sure the speakers at the convention will amply demonstrate the truth of this theme.

J. H. Constantine
President, Eastern Arts Association.